AEROSCOUT PILOT AND AEROSCOUT OBSERVER RESPONSES TO THE AIR CAVALRY TACTICAL INFORMATION SURVEY

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by

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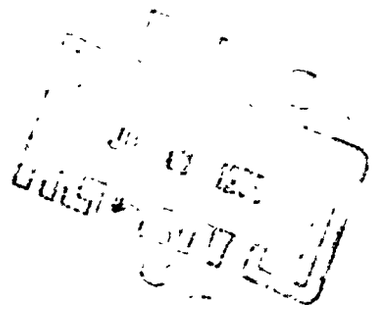

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13. ABSTRACT

A comprehensive survey questionnaire was administered to 14 aeroscout pilots and 15 aeroscout observers who had served in combat with Air Cavalry units. The objectives of the survey were to (a) examine the methods and techniques that have been used by Air Cavalry aeroscout personnel in Vietnam, (b) supplement existing knowledge of Air Cavalry operations, and (c) furnish a basis for training program development for the aeroscout pilot and aeroscout observer. Some major areas covered in the report are: flight skill requirements for Air Cavalry pilots, target detection and recognition, low level scouting techniques, map-reading skills, fire-support adjustment, reconnaissance operations, operating with tactical air, and airmobile operations. Responses indicate a need for a formal training program for the aeroscout pilot and aeroscout observer.

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ABSTRACT

A comprehensive survey questionnaire was administered to aeroscout pilots and aeroscout observers who had served in combat with Air Cavalry units. Fourteen pilots and fifteen observers responded to questions concerning methods and procedures they used in combat in Vietnam. The objectives of the survey were: (a) to examine the methods and techniques that have been used by Air Cavalry aeroscout personnel in Vietnam; (b) to supplement existing knowledge of Air Cavalry operations; and (c) to furnish a basis for training program development for the aeroscout pilot and aeroscout observer. Some major areas covered in the report are: (1) Flight Skill Requirements for Air Cavalry Pilots; (2) Target Detection and Recognition; (3) Low Level Scouting Techniques; (4) Map Reading Skills; (5) Fire Support Adjustment; (6) Reconnaissance Operations; (7) Operating With Tactical Air; and (8) Air Mobile Operations. Responses indicate a need for a formal training program for the aeroscout pilot and aeroscout observer.

Key Words

Air Cavalry
Aeroscout Pilot
Aeroscout Observer
Training
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FOREWORD

The objectives of Work Unit AIRSCOUT, a research project of the Human Resources Research Organization, are to identify training requirements, and to specify training methods and training concepts useful in developing training materials to support an aeroscout pilot and aeroscout observer training program. This document, a Research Product of Work Sub-Unit I, "Identification of Training Requirements," consists of the responses of both pilots and observers to an Air Cavalry tactical questionnaire. The purpose of the questionnaire was to obtain information about the Air Cavalry operations training that aeroscout pilots and aeroscout observers had received; and to determine the various methods, techniques and procedures used by the pilots and observers under varying types of combat conditions and combat missions.

We wish to thank LTC Gordon Stone, Command and Staff Department, U.S. Army Armor School, Fort Knox, Kentucky, for his advice in developing the questionnaire. Warrant Officer Derryl Jones, a scout pilot, was assigned to the Work Unit and assisted in the development of the questionnaire.

Work Unit AIRSCOUT was conducted by HumRRO, Division No. 2, Fort Knox, Kentucky. The Division Director is Dr. Donald F. Haggard. The Work Unit Leader was Mr. William L. Warnick. Military support was provided by the U.S. Army Armor Human Research Unit. LTC Joseph A. DeAngelis was the Military Chief of the Armor HRU when the survey was administered.

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BACKGROUND

The literature survey conducted for HumRRO Work Unit AIRSCOUT, concerning "Air Cavalry Operations," revealed a "generation gap" with respect to tactical information about the new era of warfare created by the employment of the helicopter in combat. The advent of the helicopter as a tactical weapon in Vietnam has brought about new thinking and new approaches to mobile warfare by giving the ground commander a rapid responsive air arm which provides reconnaissance and destructive power against the enemy.

New training texts are now being developed for Air Cavalry and experimental methods of helicopter employment are being explored. It was felt that a careful definition of the relevant job skills and knowledges of the aeroscout pilot and aeroscout observer and a detailed survey of relevant methods and techniques of scout employment would provide an accurate perspective of this new combat environment.

The attempt to develop a survey of Air Cavalry tactical information for aeroscout pilots and aeroscout observers was made to examine the methods and techniques that have been used by Air Cavalry personnel in Vietnam. (See Appendix A, "Aeroscout Pilot Survey Questionnaire," and Appendix B, "Aeroscout Observer Survey Questionnaire.")

Many of the tactical statements as formulated in the current manuals on Air Cavalry employment were modified to meet the unique requirements of warfare in Vietnam. This summary of the results of the survey clearly indicates and reflects the tactical employment of the helicopter in the Vietnam environment. How these findings would apply to a more conventional type of warfare remains to be evaluated and tested against conventional standards of tactical employment.

The basic elements involved in reporting information, adjustment of fire support, Nap of the Earth (NOE) scouting techniques, etc., would generally apply to most tactical environments. As always, the nature of the enemy threat determines to a large extent the various methods and techniques used.

It is intended that the information contained herein will supplement existing knowledge of Air Cavalry operations and furnish a basis for training program development for the aeroscout pilot and the aeroscout observer.

SUMMARY AND CONCLUSIONS

MILITARY PROBLEM

The literature survey conducted for HumRRO Work Unit AIRSCOUT, concerning "Air Cavalry Operations," revealed a lack of information, with respect to tactical information about the new era of warfare created by the employment of the helicopter in combat. The advent of the helicopter as a tactical weapon in Vietnam has brought about new thinking and new approaches to mobile warfare by giving the ground commander a rapid responsive air arm which provides reconnaissance and destructive power against the enemy. New training texts are currently being developed for Air Cavalry, and experimentation in helicopter employment is currently being explored in order to formulate new Air Cavalry tactical doctrine. Many of the tactical statements concerning Air Cavalry employment were modified to meet the unique requirements of warfare in Vietnam.

RESEARCH OBJECTIVES

The major research objectives were: (a) to examine the methods and techniques that have been used by Air Cavalry aeroscout personnel in Vietnam; (b) to supplement existing knowledge of Air Cavalry operations; and (c) to furnish a basis for training program development for the aeroscout pilot and aeroscout observer.

RESEARCH METHOD

The basic data sources for this Research Product were the two survey questionnaires developed by HumRRO for administration to aeroscout pilots and aeroscout observers. The pilot questionnaire was developed by a combat-experienced aeroscout pilot in conjunction with a HumRRO staff member. The development of the observer questionnaire was done in the same manner using a combat-experienced aeroscout observer. A combat-experienced aeroscout pilot and aeroscout observer were assigned to HumRRO Division No. 2 to aid in the development of the questionnaires. The questionnaires were developed from current literature, personal interviews with aeroscout pilots and observers, and personal combat experience in Vietnam. In addition, the questionnaires were critiqued by staff members of the U.S. Army Armor School who were responsible for the conduct of Air Cavalry training. Their comments were incorporated into the final questionnaires.

The type of items in the questionnaires were mainly: (1) open-end; and (2) checklist. The open-end items were designed to illicit responses concerning methods and techniques used under varying combat missions. The checklist items were designed to reduce the amount of

time involved in completing the questionnaires.

The aeroscout pilot questionnaire consisted of 294 items and the aeroscout observer questionnaire consisted of 91 items.

HumRRO Division 2 with the cooperation of HumRRO Division 5 at Fort Rucker queried all Army units at Fort Rucker and Fort Knox as to whether they had individuals who had served in a combat capacity as an aeroscout pilot or aeroscout observer in an Air Cavalry unit. All individuals who responded were personally screened as to their combat experiences and job assignments in Vietnam by a HumRRO staff member to ensure that the individuals interviewed were experienced aeroscout pilots and observers and had performed in those job categories. In two cases pilots who acted as aeroscouts for artillery units were also interviewed as they performed essentially the same missions as aeroscouts in an Air Cavalry unit. Each individual surveyed received a complete briefing by a HumRRO staff member which included instructions for completing the questionnaire. Actual questions from the survey questionnaires were used as examples to ensure that all individuals responded correctly, and each individual received this type of briefing.

Due to the length of the questionnaires and time requirements involved in completing them, the individuals surveyed were allowed to complete the questionnaires on their own time. A HumRRO staff member was available to them at all times and each individual received a debriefing and was given the opportunity to discuss any problems encountered in completing the questionnaire or to expand on any topic mentioned in the questionnaire. In instances where the individuals could devote their full time to completing the questionnaire, they were completed in the presence of a HumRRO staff member. The pilot questionnaire took approximately 16 hours to complete and the observer questionnaire took approximately 6 hours to complete.

This report is based on the responses of 14 aeroscout pilots and 15 aeroscout observers, all of whom had combat experience in Vietnam.

All answers to each question were reviewed and the consensus of the aeroscout pilot responses are presented in this report.

Differing methods and techniques were also presented as this report endeavored to present as many possible methods and techniques which the pilots found successful for use under combat conditions. One of the purposes of this report was to document what pilots found through combat experience in order to establish some basis for selection of skills and knowledges necessary for development of an aeroscout pilot training program. No attempt was made by the researchers to judge or rate the tactical validity of the responses.

The authors attempted to present as much information concerning Air Cavalry operations as possible and no attempt was made to judge or rate the responses concerning their tactical validity.

RESULTS

Aeroscout Pilot Results

Selected results will only be presented due to the amount and diversity of information presented in this report.

All pilots were assigned directly from Flight School to Air Cavalry units in combat. Training in Air Cavalry operations took place in combat units in Vietnam; no prior training in a non-combat area took place prior to unit assignment.

Flying of scout aircraft requires training in addition to what is currently being taught in the Basic Flight Course for pilots.

Most pilots did not use maps, except in an emergency. This was due to flying in the same areas and being very familiar with the terrain. The pilots felt that more training in terrain analysis would be extremely helpful and aid in low level navigation.

Prior training in artillery and aerial fire support was deemed adequate by the pilots. They felt that techniques for marking targets and marking factors should be incorporated into a training program. Coordination necessary between a scout aircraft and attack aircraft should also be included in a scout pilot training program.

Two-thirds of the pilots reported they did not have enough training in target detection. Target recognition training was not detailed enough as reported by 50% of the pilots. Seven of twelve pilots reported the training they received was not adequate for job performance, five said it was adequate.

Training in communicating with more than one station and employing different radios should be stressed more. Communication training with Air Force Forward Air Controllers should be included in a scout pilot training program.

Two-thirds of the pilots reported that the training they received on low level gunnery was not adequate. Techniques of firing at low and high speeds, hovering fire, and use of terrain in firing should be emphasized. Use of all weapons at and under 100 feet altitude should be stressed.

The pilots felt that a general knowledge of Armor, Infantry, Mechanized Infantry, and Armored Cavalry units would be useful, but

that a detailed knowledge of the Air Cavalry troop is essential.

A First Aid course oriented toward aviation and emphasizing the use of items in the aircraft First Aid Kit should be instituted. Increased training on treatment of burns, shock, back injuries and gunshot wounds should be conducted. Survival training should be mandatory for all scout pilots.

Search patterns used in a zone or area reconnaissance do not differ because of the particular mission. Area reconnaissance missions were conducted when suspected enemy activity was indicated; zone reconnaissance missions were usually a general type of search effort.

Scout teams of two aircraft usually flew with one aircraft at a higher altitude and the other aircraft flew at a lower altitude. The higher aircraft vectored the lower aircraft and thus helped it maintain its orientation while it was performing low level search missions. The higher aircraft usually did the map work, adjusted artillery, and relayed "spot" report information back to the parent station. Heavy reliance was placed on the higher aircraft taking much of the workload off of the lower aircraft.

In the conduct of security missions, scouting techniques varied little unless a change of area, situation, or enemy encountered changed.

Pilots felt it was essential to know the various types of reconnaissance and security missions performed by the Air Cavalry troop organic to the Armored Cavalry squadron, and those missions performed by the Armored Cavalry squadron.

Pilots felt that only in emergency situations should scouts be used at night in a scouting role.

Few pilots reported that they received formal training in giving "spot" reports and recommended that such training be given. Pilots reported that their observers were usually trained on-the-job to give "spot" reports even though the observers normally did not actually radio the information. "Spot" report information was usually radioed to the higher flying aircraft and they sequenced the information and radioed it back to Headquarters.

All pilots but one reported they had no previous training in making bomb damage reports, and that previous training would have been helpful. The majority of the pilots felt that the observer should have prior training in making bomb damage assessment reports prior to unit assignment.

All but one pilot reported that training in briefing the Forward Air Controller should be included in a formal training program. All pilots received training in Vietnam on how to brief the Forward Air

Controller. Fifty percent of the pilots felt that briefing the Forward Air Controller is an essential part of scout performance; the other fifty percent said it is not.

The majority of the pilots interviewed felt that training in directing airstrikes would have been helpful. Two-thirds of the pilots reported they directed airstrikes and felt it is an essential task for scout pilots. Pilots reported there was no basic difference between directing helicopter gunships and TAC units. Pilots felt the attack helicopter pilots were usually more aware and better informed concerning the current combat situation and were more effective in gunnery.

Pilots felt that performing medical evacuation missions is a part of a scout's job, although a secondary part. The observer would need to have the required skills in applying First Aid treatment. Pilots reported they facilitated the evacuation of the wounded by directing medical evacuation aircraft. Two-thirds of the pilots reported they received no training in directing medical evacuation missions. Pilot responses were divided on the advisability of a formal medical evacuation training program.

Pilots felt that directing combat assaults should be included in a formal training program. Two-thirds of the pilots reported they directed combat assaults as scout pilots. A third of the pilots reported they directed insertion of Ranger Forces.

Pilots were not agreed as to whether training in convoy cover missions should be conducted or whether the required skills and knowledges could be learned on-the-job. Methods of performing convoy cover is basically the same as for any other type of reconnaissance. None of the pilots had received prior formal training on how to link up ground elements and responses were divided on whether previous training would have made the job easier.

Two-thirds of the pilots reported their observers did not play an important role in keeping the pilot oriented during flight. Six of the fourteen pilots interviewed felt they could have done as well in low level navigation without an observer. Pilots were divided on the observer's proficiency in giving grid coordinates, and said that in situations in which the scout aircraft gave the gunship or the Command and Control aircraft grid coordinates, the pilot usually did so.

The number of targets detected by the pilot as compared to those detected by the observer was approximately 50% of the targets.

Aeroscout Observer Results

The majority of the observers interviewed served in job assignments in aircarft, usually as helicopter repairmen or doorgunners, prior to serving as aeroscout observers. Only three observers reported that they received job training as an aeroscout observer prior to their job assignment. Six of the fifteen observers reported having to take control of the aircraft during a mission due to pilot injury. All observers except one indicated they felt it was absolutely essential that the observer have minimum flight skills to enable him to take over the aircraft in an emergency.

Two-thirds of the observers reported that they used the "side scan" method of searching for targets. This is the method prescribed in Technical Manual 1-380-2, "Aerial Observer Programed Text-Visual Search," dated 14 October 1966.

Two-thirds of the observers reported that they received no training in recognition of enemy equipment before being assigned as an observer. They felt this lack of prior training made the observer's job more difficult.

Observers reported that when they first started to perform visual reconnaissance, the main reason they could not detect or recognize targets was due to the fact that they "knew neither where to look, nor what to look for." They also reported that they flew too fast and needed to get accustomed to flying at low levels. They also reported that initially there was too much to look for all at once. Approximately a third of the observers reported that they recognized target shapes but could not identify the target. Observers were divided in their responses on whether they detected most of the targets the first time they flew over an area or whether additional passes were needed. After targets had been detected binoculars were of some use in identifying the target.

Two-thirds of the observers reported that they received no prior training in aerial adjustment of artillery. Two-thirds of the observers reported that they had received training in adjustment of tactical airstrikes in Vietnam, through experience on-the-job, from scout pilots, and from Air Force personnel.

Approximately a third of the observers had performed dismounted reconnaissance during their missions, chiefly to retrieve enemy equipment, documents, or other items of an intelligence value.

Map scale preferred for use was 1:50,000 with 1:25,000 being their second preference.

Target engagement by the observers was usually done at airspeeds of from 21 to 55 knots. Firing distances were anywhere from 275 to 725 meters.

Approximately a third of the observers used image intensification devices for performing visual reconnaissance during night operations.

CONCLUSIONS AND IMPLICATIONS

Since many different subject areas are discussed in the report, the authors will endeavor to present only some of the major conclusions and implications. The results of this survey clearly indicate and reflect the tactical employment of aeroscouts in Vietnam. The methods and techniques as reported would generally apply to tactical environments where the enemy threat would be of the same nature as that found in Vietnam. As always, the nature of the enemy threat determines, to a large extent, the various methods and techniques used. How the findings in this report would apply to a more conventional type of warfare remains to be evaluated and tested against conventional standards of tactical employment.

The aeroscout pilots said that a short basic course in Air Cavalry operations should be given to pilots before their assignment to an Air Cavalry unit. Pilots felt that flying a scout aircraft at extremely low altitudes requires training in addition to what is currently being taught in the Basic Flight Course. Additional training in terrain analysis would be extremely helpful and aid in low level navigation. Both pilots and observers felt a comprehensive training program in recognition and detection of targets is required. Communication skills in reporting information and in operating several radios at a time should be emphasized. More emphasis on low level gunnery skills is required. Basic flight techniques were much the same in the conduct of a zone reconnaissance and area reconnaissance. Scouting techniques vary little from one type of mission to another. Formal training in giving "spot" reports should be given. Training in making bomb damage assessment reports would prove helpful. Procedures for briefing the Forward Air Controller should be included in a training program. All but one observer felt that the observer should have minimum flight skills in order to fly the aircraft in an emergency. Thirteen of the fifteen observers reported that they possessed the ability to fly a scout helicopter.

The implications that can be drawn from the vast amount of information presented by the report can best be summarized by saying, "A training program is required for both the aeroscout pilot and aeroscout observer." The additional skills and knowledges required for job performance for the aeroscout pilot and aeroscout observer operating with an Air Cavalry unit should not have to be learned under combat conditions as was the case with the pilots and observers surveyed in this report.

Methods of identifying and selecting aeroscout pilots and aeroscout observers for training should be undertaken, as operating in combat with an Air Cavalry unit requires a higher degree of proficiency than that normally required for other types of air units. The extremely low flying envelope required for aeroscout flying along with the other associated skill and knowledge factors makes it essential that selection procedures be developed to maximize the training expenditure and to enhance the quality of the total training product.

Some areas for additional research mentioned in the report are: (1) low level flight navigation; (2) adjustment of artillery from low levels; (3) target detection and identification; (4) minimum flight training for aeroscout observers; and (5) low level scouting techniques.

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AEROSCOUT PILOT AND AEROSCOUT OBSERVER RESPONSES TO THE AIR CAVALRY TACTICAL INFORMATION SURVEY

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AIR CAVALRY TACTICAL INFORMATION SURVEY

GENERAL PILOT BACKGROUND INFORMATION

The aeroscout pilot sample was drawn from units at Fort Rucker and Fort Knox. All pilots interviewed had combat experience in Vietnam.

Of the fourteen pilots interviewed, seven were captains; two, lieutenants; and five, warrant officers. All had served as aeroscout pilots in combat. Four pilots reported serving as a platoon leader, and two reported serving as a scout section leader. Military and flying experience is shown in Table 1.

TABLE 1

Average Military and Flying Experience of the Pilots (N=14)

Time in service - 5 years
Flying experience - 2.5 years
Total flight hours - 921
Service as an aeroscout pilot in combat - 6.9 months
Combat hours flown in scout aircraft - 512
Type of scout aircraft flown in combat - OH-6A

Basic flight training for the pilots took place from 1966 through 1970; the major portion of the pilots were trained in 1968-69. Approximately a third of the pilots received training in Armor subjects at Fort Knox before attending Flight School. Approximately two-thirds served with an Air Cavalry squadron and a third served with a separate Air Cavalry troop in Vietnam. All were assigned directly from Flight School to an Air Cavalry unit.

The pilots flew combat missions in three of the four Corps (geographical areas of Vietnam). None of the pilots interviewed flew in IV Corp (Delta Region). On reporting to Vietnam, pilots usually attended an in-country, air and ground orientation and each Air Cavalry unit conducted some type of training program before assignment to combat. Air Cavalry unit training in team and unit practice was conducted with the specific aircraft the pilot would fly in combat.

It was felt that conducting a survey of the job duties the aeroscout pilots performed besides their scout duties in a combat unit would provide valuable supplementary information. The job titles in Table 2 reflect the supplementary job duties the pilots said they were called upon to perform from time to time. In some cases, pilots

held more than one supplementary job position.

TABLE 2

Additional Job Responsibilities of Pilots*

Executive Officer (1)	Unit Solation Officer (1)
Maintenance Officer (4)	Awards & Decoration Officer (3)
Assistant Motor Officer (1)	Materiel Readiness Officer (1)
Mess Officer (3)	Armament Officer (1)
Unit Fund Officer (1)	Personal Property Officer (1)
Safety Officer (2)	Property Book Officer (1)
Troop Administration Officer (1)	Instructor Pilot (1)
Troop Information Officer (1)	Test Pilot (2)

*Number in parenthesis indicates number of pilots reporting serving in these job categories.

PILOT COMMENTS AND RECOMMENDATIONS PERTAINING TO TRAINING

SUBJECTS TO BE COVERED IN AEROSCOUT PILOT TRAINING

All the pilots said that a short basic course in Air Cavalry operations should be given to pilots before their assignment to an Air Cavalry unit. The pilots interviewed were assigned directly from Flight School to Air Cavalry units. When asked to name the subject areas they felt should be stressed in a training program for pilots they named the areas listed in Table 3.

TABLE 3

Subject Areas That Should Be Included in a Pilot Training Program

- .Duties of the aeroscout pilot
- .Scout tactics and techniques
- .Techniques of reconnoitering a specific area of operation
- .Low level flight techniques
- .Visual observation techniques
- .Target detection
- .Operating with Tactical Air
- .Types of missions and techniques used by Air Cavalry units
- .Capabilities of the Air Cavalry troop
- .Capabilities of Armor units
- .Types of scout team compositions and how they are used
- .Pilot-Observer team training
- .Employment of aircraft weapons subsystem
- .Reaction to enemy contact and enemy fire

SUBJECTS TO BE INTRODUCED INTO OR STRESSED IN AEROSCOUT PILOT TRAINING

Flying scout aircraft at extremely low altitudes requires training in addition to what is currently being taught in the Basic Flight Course. The pilots surveyed said the kinds of training listed in Table 4 should be included in or intensified in an aeroscout pilot training program.

TABLE 4

Flight Skills Required
.Intensive flight training in high density altitude and gross weight operations
.Flying slowly out of transitional lift to include flying forward, backward and sideways, and hovering out of ground effects
.More training in running landings
.Emergency procedures for low level flight and slow flight
.High gross weight autorotations
.Low level autorotations
.Nap-of-the-earth flight skills
.Actions to take on enemy contact and enemy fire
.More training in emergency procedure crashability techniques
.Capabilities of aircraft - Preflight inspection of aircraft should stress what to look for when an aircraft is constantly flown at its limitations

MAP READING DURING LOW LEVEL NAVIGATION FLIGHT

The majority of the the pilots said the map reading instruction received during flight training was adequate. Most pilots did not use maps as scouts, except in an emergency. The Cobra gunship (high bird) did most of the navigational work for the scout aircraft and vectored the scout as he reconnoitered at low levels. Another reason given for the lack of map usage was that the pilots worked the same area of operations day after day and became very familiar with it. There were no problems reported in map reading if the aircraft was at a high enough altitude where prominent terrain features and landmarks could be recognized.

In Vietnam the scout team composition of a high-low aircraft lent itself to this method of operation: The pilots felt that more training in terrain analysis would be extremely helpful and aid in low level navigation. (Authors' note: In the event of a mid-intensity conflict with a much higher density of anti-aircraft fire, this method may have to be changed; placing a much higher reliance on low level navigational skills.)

ARTILLERY AND AERIAL SUPPORT FIRE ADJUSTMENT

All the pilots said training received in Flight School on artillery fire adjustment was adequate. In some instances the pilots said the scout pilots let the Cobra gunship (high bird) request and adjust the artillery fire since his visual position was better for fire adjustment. (Authors' note: In the event that future warfare dictates extremely low levels for flight, then adjustment of artillery from low levels will become a necessity.)

All the pilots said the training received in Flight School on adjustment of aerial fire support was adequate. Some relevant comments are: (a) Pilot techniques for marking targets should be incorporated in the training program; (b) Marking factors include airspeed, altitude, and terrain factors such as foliage, slope of ground, dry or wet weather, and ground conditions should also be taken into account; and (c) Tell the gunship the best way to approach the most vulnerable part of the target, and to especially inform the gunship of the target location in dense jungle. When working with tactical air in adjusting aerial fire support, the high aircraft gunship (Cobra) often did the coordination with the Forward Air Controller instead of the low aircraft.

TARGET DETECTION AND RECOGNITION

Approximately two-thirds of the pilots said they did not have enough training in target detection. Some comments follow: (a) Not enough was explained about how to look for targets in dense growth or when the target was well camouflaged; (b) The pilot was not trained to look for different targets in various types of terrain; and (c) There should be increased emphasis on low level target detection using actual targets to be found under combat conditions, including the widest range of possible targets and target indicators in a training program. For example, a vehicle shooting, muddy water, ammunition and ration boxes. One pilot said classified photographs of enemy equipment should be released. In other words, if it is the mission of the scout to locate the target, he must be taught to find what he is looking for. Increased aircraft flight training at low levels is required. Some target indicators reported by the pilots are listed below:

1. Bunkers were rarely found very close to a trail; usually they were approximately 50 meters from it.

2. Usually they did not find one bunker by itself.

3. Differences in color of vegetation used for camouflage helped in detecting bunkers.

4. The base of a tree or a rise in the ground is a good place to look for a bunker opening.

5. If there is both heavy and light vegetation, look in the heavy for the enemy.

6. A maze of small trails indicates the possibility of a bunker area or a rest area.

7. Wood cuttings may indicate bunkers.

8. In reconnoitering an old trail, look as far as 100 meters on both sides for possible new trails.

Approximately half of the pilots said the flight training they received in recognition of enemy personnel and equipment was not detailed enough. Two-thirds reported receiving such training before being assigned to an Air Cavalry unit, the training being conducted by their units. Seven of twelve pilots said the training they received was not adequate for job performance; five said it was adequate. General comments were as follows: (a) Training was not wide enough or intensive enough; (b) Such training should include information about the techniques, weapon capabilities, organization, terrain usage, and movement capabilities of both the North Vietnamese Army (NVA) and the Viet Cong (VC); (c) A general coverage of all information related to target detection should be required for all pilots, but highly detailed coverage for units working a specific combat area of operation; and (d) Units in Vietnam conducted good training programs in target detection and recognition, but pilots could have been taught a good working knowledge before being assigned to Vietnam.

COMMUNICATION TRAINING

The pilots were asked to specify radio communication skills and knowledges that should be emphasized or included in a scout training program. They said the training in transmitting messages to more than one station at a time and practice in employing different radios should be stressed. Communications with the Forward Air Controller should be included, and procedures for requesting artillery and gunship fire support is essential. "Brevity," "exactness," and "knowing what to say before transmitting," were the terms the pilots indicated as good radio communication procedures.

LOW LEVEL GUNNERY

Approximately two-thirds of the pilots said the training they received on low level gunnery was not adequate. Five pilots said they received no gunnery training until they were assigned in Vietnam.

The pilots said that techniques of firing at low and high speeds, hovering fire, and use of terrain in firing should be emphasized. Training in maintenance of the XM-27E1 Weapons Subsystem should be included. Use of all weapons at and under 100 feet should be emphasized. More practice and more live fire exercises are needed because a pilot needs to develop a quick reaction time so as to engage a target as soon as he identifies it. (Authors' note: In certain cases Air Cavalry units did not use the XM-27E1 Weapons Subsystem on their aircraft, but instead, used an observer or observer doorgunner equipped with the M-60 machine gun.)

ORGANIZATIONAL STRUCTURE OF AIR CAVALRY UNITS

Approximately two-thirds of the pilots said that a general knowledge of the organizational structure of Regiments, Armor, Infantry, Mechanized Infantry and Armored Cavalry would be useful. All pilots said that general knowledge of Armored Cavalry Squadron organization and detailed knowledge of Air Cavalry Troop organization are essential.

FIRST AID TRAINING

Two-thirds of the pilots said the medical training they received was adequate. Training on treatment of burns, shock, back injuries, and gunshot wounds should be increased or emphasized. A First Aid course oriented toward aviation and emphasizing the use of items found in the aircraft's First Aid Kit should be instituted. A refresher course should be given before assignment to a combat unit.

SURVIVAL TRAINING

All pilots, except one, said the training received on survival was adequate. The Navy course of instruction at Subic Bay, Philippines, was cited as an excellent course, one that should be mandatory for all pilots.

AIR CAVALRY OPERATIONS

ZONE RECONNAISSANCE OPERATIONS: AIRSPEEDS AND SEARCH PATTERNS

Preparation

All pilots set up some sort of a predetermined search pattern or plan of search before entering the zone. This procedure helped them to establish a basis for more thorough coverage of the zone, and such a systematic approach to searching saved time in accomplishing the

mission. Two-thirds of the pilots located the visible boundaries of the zone before starting a reconnaissance. They said that doing so helped them cover the zone more thoroughly. The high aircraft directed and vectored the low aircraft to facilitate low level navigation and to facilitate more thorough coverage of the zone. The high aircraft usually was a gunship when the scout team consisted of an LOH and Cobra gunship.

When asked what types of search patterns they used, the pilots said they used all types of search patterns in performing a zone reconnaissance. The types mentioned were: (a) right-hand turns (orbits); (b) box pattern; (c) zig-zag; and (d) race track. Other considerations were that the patterns used depended on the geographical configuration of the zone an on enemy activity suspected or known.

When the pilots were asked what airspeeds they normally used in performing a zone reconnaissance, their responses fell within four airspeed groupings: (a) 0-20 knots; (b) 20-40 knots; (c) 40-60 knots; and (d) 60-80 knots.

Top speed was in the 60-80 knots bracket, only two pilots indicated a top speed of 80 knots. The 0-60 knots airspeed seems to be the preferred speed range for use in performing a zone reconnaissance.

Considerations When Performing a Zone Reconnaissance

1. Each of the following; high ground, numerous or large open areas, areas which offer good concealment, determined to some extent the approach to be taken in each situation.

2. Did not fly parallel to terrain features.

3. Pilots needed to know the enemy and kept their own exposure time to a minimum.

4. The pilot should use a systematic search pattern until a target or suspected target is located; then he should use a detailed search pattern of the target area.

5. The pilot should locate major targets within the zone and concentrate on them.

6. The pilot should vary the search patterns so that the enemy cannot anticipate the path of flight.

7. If the zone is large, the pilot should break it into small areas to ensure complete coverage.

8. Worked trails most often to discover enemy movement.

9. Worked close to terrain and preferably into the wind.

10. Flying along trails, the pilot should first fly at 80-100 knots.

11. The pilot should fly the zone as the terrain dictates.

Effects of Terrain on Techniques

All pilots indicated the type of terrain helped to determine their search patterns and methods of operation. Listed below are comments about the procedures they followed in flying over various types of terrain:

1. Open Terrain

a. Flew fast as possible and utilized any available cover. Open ground required more diversification of flight patterns so as to utilize existing cover.

b. If the zone was flat, the pilots used a series of S patterns, because a more or less constant altitude and airspeed could be maintained during terrain observation.

c. They used a zig-zag pattern and relatively high speed to avoid the risk of becoming an easy target.

2. Wooded Terrain

a. The pilots stayed close to trees, flying slow. They did not fly past an area without seeing and kept transitional lift at 20 knots.

b. They reconnoitered the high ground first. If foliage was dense, openings in the foliage were then reconnoitered.

c. In general, the more dense the foliage, the slower they flew.

3. Rivers

The pilots reconnoitered 50-75 meters from the banks first, then searched along the banks.

4. Hilly or Mountainous Terrain

a. The pilots could not use S turns and flew more or less in a straight line.

b. They always reconnoitered the high ground first and examined the lower terrain levels later.

c. They normally covered valleys and hilltops by using circular or contoured flight patterns.

d. In mountains they reconnoitered the ridges first.

e. In mountainous terrain they tried to follow the contours of the land as much as possible and reconnoitered prominent terrain features one at a time.

Effects of Terrain on Airspeed

1. Open Terrain

a. Over open areas with no vegetation pilots may fly as fast as possible, but slow enough to thoroughly accomplish good observation.

b. Over open areas, high speed, usually 60-80 knots was required to ensure a safe reconnaissance.

c. Over open (flat) areas with vegetation, slower airspeeds may be required, since vegetation may mask enemy activity.

2. Wooded or Densely Covered Terrain

The more dense the vegetation, the slower the airspeeds need to be to conduct a good reconnaissance.

3. Hilly or Mountainous Terrain

a. The airspeed would be slower if the area contained moderate to heavy vegetation. Changes in altitude are required to ensure a thorough reconnaissance.

b. To conduct effective reconnaissance the aircraft had to be hovered.

4. Miscellaneous

a. Initial reconnaissance for any area is made at 30-60 knots.

b. Speed of reconnaissance is generally 40-60 knots as required for a thorough search.

c. Enroute airspeed to reach the area of operations is generally 100 knots.

d. In flying under high density altitude conditions, must stay within transitional lift.

Pilot Actions in Response to Enemy Contact in Performance of a Zone Reconnaissance

When the pilots were asked if they called for immediate support (gunship, artillery, TAC) on locating a target before continuing their reconnaissance, two-thirds of them answered "No."

1. Determined whether the team could handle the situation.

a. Was it necessary to do anything but report it. Found out what had been located before taking any action.

b. If no enemy fire was received, continued to reconnoiter, giving continuous spot reports to the gunship. If enemy were present, eventually the scout drew their fire.

c. If the scout suspected recent enemy activity in the area without contact, the lift section was requested to insert aerorifle elements for a more detailed reconnaissance.

d. If enemy personnel were discovered, fire support was brought on them immediately.

e. If the target was fortifications, completed reconnaissance and then returned to most lucrative target.

f. If no fire was received, completed reconnaissance for intelligence information.

g. If fire was received, returned fire and requested support from the gunship or other sources as the situation dictated.

2. If the gunship could handle the target, the scout marked the targets and got clear of the area, and observed and adjusted fire.

AREA RECONNAISSANCE OPERATIONS

Two-thirds of the pilots felt that the search pattern used in an area reconnaissance does not differ from that used in a zone reconnaissance. The basic flight techniques are the same. The search in an area reconnaissance is usually made for specific items, whereas a zone reconnaissance is a general type of search effort. Area reconnaissance missions are conducted when there is usually some suspected enemy activity. The search effort is more detailed for an area reconnaissance; also, airspeeds are slower and flight patterns are randomized.

A good map reconnaissance is essential before takeoff to be sure that high ground and likely locations for enemy contact are indicated.

The scout aircraft was usually vectored within the area by the high aircraft (gunship). Suspected or likely enemy locations were reconnoitered first. It was pointed out that the radio magnetic indicator was the most useful instrument in the aircraft for reconnaissance reference purposes while in flight.

Pilots who perform an area reconnaissance should know or perform the following:

1. Perform a good map reconnaissance before the flight.

2. Know what types of support are available, e.g., Tactical Air, Artillery, Infantry.

3. Know the location of friendly ground elements.

4. If possible, know the locations of the enemy, their type, strength, and weapon capabilities.

5. If possible, reconnoiter by fire.

6. Get clearance to fire before beginning a search.

7. Treat new areas as "hot" areas and therefore, reconnoiter them at a higher airspeed.

8. Reconnoiter high terrain first.

9. Do not spend time on the unimportant. The key to good reconnaissance is to find it, report it, and continue to perform reconnaissance.

ROUTE RECONNAISSANCE OPERATIONS

Useful Methods

A number of different approaches were mentioned for use in performing a route reconnaissance. Listed are four useful methods:

1. Reconnoitered high ground and reverse slopes within mortar range of the route, then made a close search 50 meters each side of the route with a detailed reconnaissance at potential ambush sites.

2. In a two aircraft team, usually flew in a right echelon on the right side of the route and then down the left side. If the area was open, each aircraft flew one on each side of the route.

3. Usually made one pass between tree line and the road, then moved further away from the route and then reconnoitered the other side of the route in the same way.

4. Made S turns, low and slow, over the route with the route being in the middle.

Items to Look For

1. Potential ambush sites
2. Closeness of trees to the road
3. Width and type of road
4. Amount of road usage
5. Road condition, including destruction
6. Type of road surface and condition
7. Drainage
8. Areas on either side of the road; e.g., swamp, jungle
9. Evidence of enemy movement, including number of personnel, time of movement, and kind of movement
10. Bridges and culverts
11. Mines
12. Side roads and trails
13. Any change in route conditions since last reconnaissance
14. Activities of friendly personnel using the route
15. Fording locations

RECONNAISSANCE ALONG A RIVER

Useful Methods

The methods for a river reconnaissance are very similar to those used in a route reconnaissance, as would be natural, a river being a water route. Some comments are as follows:

1. Stay over the trees as much as possible, never over the water.

2. After covering the course of the river, work on either side about 50 meters away from the banks, then approximately 100-150 meters away.

3. Fly S turns to inspect either side for enemy indicators.

4. Use reconnaissance by fire in suspted areas.

5. It is extremely difficult to locate camouflaged targets along a river.

6. Use the rotor wash to blow vegetation in dense areas.

Features to Look For Along a River

1. Boat landing points
2. Signs of mined areas
3. Width of the river
4. Depth, usually ascertained this visually if possible

5. Type of bottom; ascertained visually, and in some instances, dropped grenade to ascertain soil composition, sand bars, sometimes landed in shallow water
6. Fording locations
7. Slope of the banks; line aircraft skids parallel to ground and estimate angle of bank of the aircraft. Expressed slope as shallow, moderate, steep, and included indications of growth, e.g., moderate slope, scattered bamboo, east access. Another descriptive category used was: steep, medium, gentle, also indicating whether a steep bank is passable
8. Speed of the current; rough or calm water, leaves and grass, floating debris
9. Trails leading to the river
10. Bridges, footbridges, and trees felled or fallen across the waterway
11. Obstacles to navigation
12. Trafficability of the channel
13. Ambush sites
14. Signs of enemy usage of the river, either in crossing it or using it as a route of movement
15. Location and size of sunken boats
16. Old/new fortifications
17. Habits of personnel using the river, e.g., what type of personnel use the waterway, type of traffic, what they use it for

SECURITY MISSIONS

Scouting techniques varied little unless a change of area, situation, or enemy encountered changed. The scouts were adaptable to the situation. Scouting in advance of ground forces was performed at higher airspeeds. The closeness of friendly ground troops and the nature of their mission helped determine guidelines for operation. Scouts should be aware of the ground units' mission and the problems related to it. In operating with ground units the scouts usually operated 360 degrees around them and usually flew slower and closer to them. If enemy fire was received the location of friendly troops was determined before enemy fire was returned, and changes in the location of friendly ground troops was ascertained before fire support was requested.

OTHER ASPECTS OF RECONNAISSANCE AND SECURITY MISSIONS

Knowledge of Various Unit Functions

The majority of the pilots said it was essential to know the various types of reconnaissance and security missions performed by the

Air Cavalry Troop organic to the Armored Cavalry Squadron, and those performed by the Armored Cavalry Squadron. They related these type missions to a conventional type of warfare and said the Vietnam War is an exception to conventional warfare, although they indicated that under these conditions, scouting techniques vary little from one type of mission to another.

Air Cavalry Operations at Night

None of the pilots interviewed had used night vision equipment in their role as a scout pilot. Most pilots said that only in emergency situations should scouts be used at night in a scouting role, as the aircraft is not equipped for night flying. A few of the pilots did perform some visual reconnaissance at night around base camps and fire bases using a firefly aircraft. In such instances the types listed were infrequent and as the situation demanded. Some examples are: medical evacuation, resupply, and maintenance supply.

Some of the specific skills and considerations which the pilots felt were essential in the performance of night missions are:

1. Performance of maneuvers as taught in Flight School concerning night flying
2. Familiarity with the terrain in the area of operations
3. Keep cock-pit lights dim
4. Exceptionally clean windshield
5. Essential to have a co-pilot
6. Flight pattern; use right hand overlapping circles to clear the aircraft from obstacles
7. Did not use landing lights, used position lights instead (glow from position lights gives off enough light)

Electronic Sensing Equipment

The pilots mentioned only two types of equipment: (a) "sniffer" equipment mounted in a UH-1 aircraft; and (b) electrically powered binoculars. One pilot said he flew at least one mission a week using "sniffer" equipment. Approximately two-thirds of the pilots said they used no electronic sensing equipment.

Chemical and Radiological Agent Monitoring and Survey Operations

Only one pilot said he had received training for these types of operations, and had received his training when he served with Special

Forces at Fort Bragg, North Carolina. None of the pilots said they had performed this type of combat mission.

REPORTING INFORMATION OBTAINED BY RECONNAISSANCE

GENERAL COMMENTS OF PILOTS

Most of the pilots said they had to give spot reports many times during the course of a normal mission. One pilot said he "normally gave spot reports eight to fifteen times per mission." The pilots had used three methods of learning how to give spot reports: (1) listening to spot reports being given, (2) talking to other pilots, and (3) giving them the way they thought best.

Very few said they received formal training in giving spot reports and recommended that such training be given. Spot report formats vary from unit to unit, but the makeup of a spot report and the sequence of its elements can be taught.

Two-thirds of the pilots said their observers were trained to give spot reports, usually on-the-job. But the observers normally did not make spot reports, even though they knew how. The pilots said the observers should be trained to make spot reports before being assigned. General comments on spot reports by the pilot or the observer are the following:

1. The pilot would give the spot reports, even if the observer was trained to make them.

2. The pilot did not want the observer to tie up the radios, even though sometimes it was difficult for the pilot to give reports and fly at the same time.

3. It is much better for the pilot to run the radio, for observers usually have no experience.

4. If the pilot cannot talk and fly at the same time, he should not be there.

5. It would be helpful if the observer had a basic knowledge of reporting, but content of the reports will vary with mission, terrain, and pilot preference.

Five of the pilots said that they relayed their information to the gunship that was flying at a higher altitude, and was in a better position to get the grid coordinates for the target or target area. The gunship would sequence the information and radio it back to headquarters. The scout pilot would mark the target and relay the information to the gunship.

TYPES OF SPOT REPORTS AND INFORMATION CONTAINED

The pilots were asked to characterize the following types of spot reports: (a) trail spot reports; (b) bunker and fighting position spot reports; (c) structure spot reports; and (d) anti-aircraft weapon spot reports. The pilots were also asked to specify, for each type of report: (1) how they learned or derived the information reported; (2) what information they included in the report; and (3) the format they used in the report. The information obtained is summarized below:

1. Elements of Trail Spot Reports:

   a. Time. The pilots said the gunship should give this information, established by noting the time on the aircraft clock.

   b. Grid coordinates. The pilots said that the gunship should provide such information, as target coordinates can be determined more accurately from altitude.

   c. Direction of movement. Indicators for which to look: (1) footprints; (2) condition of grass and limbs; (3) wheel marks; and (4) drag marks, e.g., look for a log across the trail; where enemy personnel jumped over the log, it is usually more dusty and the direction of movement can be ascertained. This technique is especially helpful on hot, dry, hard ground. If enemy personnel crossed a creek or waterway, look for signs of wetness on the bank where the personnel came out of the water.

   d. Direction of trail. This is usually established by using the radio magnetic indicator. General direction was usually given for a trail. The gunship gave actual coordinates from the map. The magnetic compass was also used to ascertain direction with preference given to using the radio magnetic indicator as the first choice.

   e. Number of personnel using trail. Indicators for which to look: (1) footprints, clearness of impressions in mud or sand; (2) trampled grass, limbs on trail and along trail; (3) width of use of trail to give indication of the number the trail can support in moving along it; (4) how hard-packed the ground is; (5) mud splashed on objects along the trail; and (6) condition of leaves on the trail, normally top surfaces would be dry and underside damp. If personnel moved through the area some leaves would be disturbed and would appear damp, indicating movement through the area. (NOTE: In some cases, the number of personnel using the trail cannot always be ascertained merely by using footprints as the only indicator. The enemy will follow in each other's footprints.

A small trail can be used to move as many personnel as a large trail as sometimes they will move in single file on a larger trail.) Other indicators which the pilots ranked less important than the ones above were: (a) muddy water on the trail; (b) water marks above or below breaks in grass or limbs; and (c) color or texture of the trail.

A technique used by one of the pilots to detect movement along a trail was to drop a yellow smoke grenade on the trail. The dye would stain the surrounding area and if the stained area was scuffed away completely, it indicated that quite a few personnel had moved past that area. Yellow was recommended as it would not be as conspicuous as a dark color dye to the enemy personnel.

f. Width of trail. Usually estimated the width by comparing the size of the trail to objects around it.

g. How often trail was used. Primary indicators for which to look: (1) old/new footprints; (2) condition of foliage around the trail. Other indicators mentioned were: (a) night camp locations along the trail; (b) objects that have been cleared from the trail; (c) disturbance of water, run-off patterns; (d) debris on the trail; (e) domesticated animals along the trail; and (f) comparison from last time the trail was checked.

h. Bridges along trail. Reported by specifying: (1) length and width in meters; (2) capacity; (3) type of construction; and (4) condition of construction. Capacity was estimated, and in some instances, capacity was reported by people, not weight.

i. Graves along trail. Reported by specifying: (1) number, and (2) new/old. In some cases the enemy painted flags on wooden markers to designate graves. (NOTE: Sometimes the enemy buried more than one body per grave site.)

j. General comments. Some additional items reported were: (1) indications of heavy equipment along the trail; (2) indications of wounded personnel using the trail; (3) type of overhead cover along the trail; (4) any action taken by the scout pilot; and (5) the pilot's plan of action.

2. Bunker and Fighting Position Spot Report:

a. Time. Use aircraft clock; the gunship provides this information.

b. Grid coordinates. The gunship provides this information.

c. Number of bunkers and fighting positions. Estimated when there are numerous bunkers and fighting positions reported, when a count can be made.

d. Size. Reported by estimating length and width in meters. Also reported number of each size.

e. Type, kind, and composition. Reported by specifying: (1) type of material; (2) degree of permanence of structure; (3) type of overhead cover; (4) kind of camouflage; and (5) approximate age of structure.

f. Area bunkers and fighting positions cover and how set up. Estimated size of geographical area covered by length and width in meters. Reported by specifying: (1) objects and terrain features relative to bunkers and fighting positions; and (2) whether set up in a square, perimeter, or circle.

g. Recent use. Indicators for which to look: (1) footprints; (2) campfire and cooking fires; (3) signs of usage at entrances; (4) activity on trails leading to and from the area; (5) smell of food and incense; (6) recent repairs, or recent changes to bunkers, fighting positions, etc.; (7) recent cuts in the foliage; (8) deterioration of cardboard cartons in the area; (9) domesticated animals; and (10) condition of camouflage.

h. Supplies in area. Reported in terms of: (1) weapons; (2) ammunition; (3) food; (4) clothing; (5) cooking utensils; (6) tools; (7) domesticated animals; (8) baskets used to carry supplies; (9) picnic type tables; (10) discarded ration containers will indicate type of rations used, this may help in the determination of recent usage as well as the distance the personnel has moved; (11) rice and fish drying; and (12) water source. All of the above items could also indicate recent usage.

i. Trails to and from area. Reported in terms of: (1) number of trails; (2) direction of trails; (3) condition of trails; (4) age; (5) type and condition of camouflage; (6) amount and recency of use; and (7) width of trails.

j. General comments. Some additional considerations were: (1) look for booby-trap signs along the trails, usually placed in least noticeable places; (2) lack of heavy movement into an area does not mean enemy personnel are not present, they sometimes hole up for a few weeks;

(3) look for sources of water for drinking or utility and report them; (4) enemy personnel usually leave various supply items which indicate the presence of personnel; (5) report presence of personnel and number, and report type of military unit if identifiable by uniforms, weapons, insignia; (6) bunkers with radio antennae are likely to indicate command bunkers; (7) estimate number of personnel that bunkers would hold; (8) report type of weapons present and if firing; and (9) report any action taken.

3. Structure Spot Report:

a. Time. Provided by consulting the aircraft clock. The gunship provides this information.

b. Grid coordinates. The gunship provides this information.

c. Number of structures. Estimated if they are numerous, or reported if a count can be made.

d. Size. Reported by estimating length, width, and height in meters.

e. Type and kind of structure. Reported by specifying; (1) degree of permanence, to provide information on amount and recency of use; and (2) condition and state of repair. (NOTE: Types of structures will vary with the geographical area. Scouts should be aware of the differences in the types of building structures.)

f. Area and position of structures. Estimated by specifying: (1) length and width in meters; (2) layout of structure; e.g., circle or square; and (3) location of structure in relation to the terrain.

g. Recent use. Indicators for which to look: (1) footprints; (2) campfires and cooking fires; (3) activity on trails to and from the area; (4) smell of food and incense; (5) repairs or alterations to installations; (6) condition of camouflage; (7) baskets and utensils; (8) domesticated animals; (9) corn racks; and (10) nearby cultivation.

h. Supplies in the area. Reported in terms of: (1) weapons; (2) ammunition; (3) food; (4) clothing; (5) cooking utensils and tools; (6) domesticated animals; and (7) water sources.

i. Trails to and from structure. Reported in terms of: (1) number; (2) direction; (3) age; and (4) evidence of usage or wear.

j. General comments. Additional recommended actions were: (1) check for presence of anti-aircraft weapons; (2) find out if structures are in usable condition, if so, usually destroy them; and (3) report any action taken.

4. Anti-aircraft Weapon Spot Report:

a. Time. Provided by the gunship by reference to the aircraft clock.

b. Grid coordinates. The gunship provides this information.

c. Number of weapons. Determined by trying to count the weapons that are firing. Report any other weapons suspected. The number of weapons firing may be estimated from the amount of fire being received.

d. Number of personnel. Reported on the basis of an estimate or actual count of the number of personnel required to fire the weapons.

e. Tactical disposition of weapons. Reported in terms of the position of weapons in relation to each other: (1) three-way trap, three weapons covering the same area of fire; (2) woodline trap, placement of weapons along the edge of woodlines in support of each other; and (3) ravine or valley trap, placement of weapons to fire at the aircraft when the flight path follows a prominent terrain feature.

f. Area of fire weapons cover. Reported by specifying: (1) area dimensions in meters; (2) altitude covered (determined by use of altimeter); and (3) blind spots not covered by the firing weapons.

g. Amount of fire being received. Reported by specifying: (1) interval of fire; and (2) amount of fire being received by determining the type of weapon being fired.

h. General comments. The following recommended actions were also mentioned: (1) always inform the gunship when fire is received; (2) determine whether the gunship can neutralize the weapon(s) or if additional support is needed; (3) report "sucker bait" situations, e.g., personnel in open field, open cache, unmanned weapon positions; (4) mention type of weapon emplacement, e.g., horseshoe, doughnut; (6) report action taken, e.g., returned fire; (7) if position is active, ask for help, never risk more heavy anti-aircraft fire, if there is, the reconnaissance is successful; (8) if the pilot thinks he has taken hits,

he should make sure immediately; and (9) mark target or target area with smoke and let the gunship or tactical air engage the target.

BOMB DAMAGE ASSESSMENT (BDA) REPORT

All pilots performed Bomb Damage Assessment (BDA) missions, and said it was an essential part of the scout's job. All pilots but one said that they had no previous training in reporting BDA, and that previous training would have been helpful in making such reports. About half of the pilots said their observers reported BDA and half said they did not. Observers who did give BDA reports gave the information to the pilot, who consolidated it and made the actual spot report. The majority of the pilots said the observer should have had formal training in making BDA's before being assigned to a unit. The pilots disagreed about whether it would have reduced the pilot's job load for the observer to give the BDA's. However, they did say that the pilot should radio the information, and that the observer should be observing. The pilots said a good complete BDA to the Forward Air Controller (FAC) was essential as FAC responds better to calls for assistance. One pilot commented that a BDA mission is essentially a reconnaissance mission.

ESSENTIAL INFORMATION IN A BDA REPORT

1. Number of personnel killed is reported by specifying actual body count, indicated by such details as parts of bodies, blood, packs, and equipment.

2. Items destroyed are reported by specifying what items were destroyed and how many.

3. Size of area or items destroyed is reported by specifying what percentage of the area was covered by fire support.

4. Effectiveness of the strike is reported by specifying the resulting damage, that is, what percentage of the target or targets was destroyed, and what was missed by fire support.

5. Enemy activity after the strike is reported by specifying what the enemy did thereafter.

6. Type of fire support - some pilots reported whether fire support was surface, subsurface, or air burst, but the item was given a very low priority for inclusion as a part of BDA.

METHODS AND PROCEDURES USED IN MAKING A BDA REPORT

The scout pilot should observe fire support from one side of the area and adjust fire as requested, and enter the area immediately after the last aircraft has made its pass or after the last round explodes. He should make a series of runs at treetop height at 80 knots minimum; to make himself least vulnerable to enemy fire, but giving him a chance to look over the area. (NOTE: The pilots said when making the initial low level run, they would normally receive enemy fire.)

If the scout felt, after performing the high speed runs, that the area was safe he would continually reduce speed on succeeding runs, making a detailed search until a thorough report of the situation could be made. In some instances, the enemy would wait until the scout was making slow runs (10 knots) before firing. In performing the detailed search, it is best not to get near the ground, because the rotor wash may disturb any signs of the enemy before the scout sees them. Normal search patterns are right hand orbits, zig-zag, and back and forth S patterns.

MISCELLANEOUS

In most combat situations, an actual count is impossible, especially from the air, but an air estimate is essential. Time and enemy fire are main factors. In situations requiring a quick, close-up assessment, the aeroscout is ideal; if a more detailed assessment is required, BDA teams were sometimes utilized, and consisted of an Intelligence Officer and an Air Force BDA Officer.

BRIEFING THE FORWARD AIR CONTROLLER (FAC)

TRAINING AND RESPONSIBILITY OF PILOT AND OBSERVER

Over half of the pilots said they had to brief the Forward Air Controller (FAC) aircraft as a part of scouting. Tactical Air Command (TAC) airstrikes were sometimes coordinated with Command and Control (C&C) aircraft rather than with the scouts. All pilots who did have to brief FAC received relevant training in Vietnam; none received such training before assignment to a unit. All but one pilot said that briefing of the FAC should be included in a formal training program, which the majority of the pilots said would have improved performance. Approximately a third of them said they briefed the FAC frequently; equal percentages of the others said, "every so often," "rarely," and "never."

Training in Vietnam consisted of: (a) information formally presented by FAC personnel and compiled as a unit SOP; and (b) unit training and experience. A little over half of the pilots said that briefing the FAC was an essential part of scout pilot performance; the other half said it was not.

Two-thirds of the pilots said that someone else, not the scout, could brief the FAC, especially on preplanned strikes, and specified the mission commander, the C&C aircraft, the gunship, and last, the observer. The scout would adjust support fires. Two-thirds also said the observer did not have to be trained to brief the FAC. Some comments were: (a) the scout pilot is responsible for this, (b) too many other personnel are available to perform this function, (c) if the observer is to master radio communications, it would interfere with his main responsibility, (d) the majority of pilots can better evaluate the situation and have more knowledge of ordnance available, and know where they want to set up a pattern during the strike, (e) pilots felt the observer could brief FAC, and (g) if it is unit policy to have scouts brief the FAC, the observer also should be trained to do so. Those pilots who said the observers should receive this type of training also said it should be given formally before unit assignment. All pilots but one reported that their observers did not brief the FAC, and said it would not ease the pilot's job if the observer was trained to brief the FAC. One pilot said that he had never been in a position where the FAC worked for the scouts, and that Air Cavalry units were usually assigned to the Air Force as target acquisition elements.

ESSENTIAL INFORMATION USED IN BRIEFING THE FAC

1. Number of targets is specified by reporting actual count, or by estimate if the number is large.

2. Target description is specified by reporting as accurately as possible what was seen.

3. Target location is specified by reporting the grid coordinates.

4. Target area is specified by estimating target length and width in meters.

5. Enemy fire is reported by number, type, and location of weapons.

6. Recommended type of ordnance to use - (a) point detonating; (b) delay fuse; (c) variable time fuse; (d) napalm; (e) cluster bomb unit; (f) white phosphorous; and (g) CS (tear gas).

7. Friendly ground personnel - Give their locations and mark their positions, if required. If none are there, say so.

8. How scout will adjust - Specify the method employed so the FAC knows exactly what to expect of the scout.

9. General - Altitude of the target, altitude of obstructions in the area, methods of delivery of fire support on the target, ceiling, wind direction, and speed. A large portion of the pilots checked these as considerations to be included in briefing the FAC. (The scouts felt that the FAC himself, rather than the scout could better determine these considerations.)

MISCELLANEOUS COMMENTS

1. Report description of the terrain.

2. Report location of the target in relation to the terrain.

3. Report type of canopy and foliage, because point detonating and variable time fuses do not work well in thick cover.

4. Let the FAC decide what armament to use.

5. Reconnoiter the area after the strike and give corrections, if required, for fire adjustment, and recommendations on armament changes.

TYPE OF ORDNANCE TO USE FOR VARIOUS TYPES OF TARGETS AND TERRAIN

The pilots listed the types of aerial ordnance they recommended for use against specific targets and types of terrain as follows:

1. Point Detonating Fuse

Targets	Terrain
a. Caches	a. Terrain with sparse foliage
b. Bridges	b. Hard terrain
c. Buildings in the open	c. Terrain with relatively little canopy
d. Roads	
e. Bunkers in the open	

2. Delayed Fuse

a. Bunkers	a. Terrain with triple canopy
b. Well fortified positions	
c. Tunnel complexes	
d. Targets that must be penetrated	

3. Variable Time (VT) Fuse

Targets	Terrain
a. Troops in the open	a. Rice paddies in wet season
b. Trucks	b. Sparsely covered terrain

4. Napalm

a. Troops in bunkers and buildings	a. Area which will burn
b. Houses	b. Dense forest
c. Caches	c. Dense foliage, triple canopy
d. Fighting positions with overhead cover	
e. Troops in rocks, in dense foliage	
f. Any structure which will burn	

(NOTE: No matter what the target is, napalm has a tremendous demoralizing effect, even without kills.)

5. Cluster Bomb Unit (CBU)

a. Troops in the open	a. Light foliage
b. Troops in fighting positions	b. Large area of coverage

6. Other Bombs

a. White phosphorous; troops in dry field	
b. CS (tear gas); troops	

(NOTE: Scouts should know the difference between low and high drag bomb that is used by the Air Force.)

EXAMPLE OF RECOMMENDED PROCEDURE AND MODIFICATIONS USED WITH FAC OR TAC

Procedure Used by One Pilot

1. Determine the need for an airstrike.

2. Contact and brief the FAC.

3. The FAC contacts TAC.

4. Mark the target for the FAC and move out of the target area.

5. The FAC marks the target for TAC when they arrive. The FAC usually adjusts fire from its marking rockets.

6. The FAC briefs TAC as to target, direction of attack, etc.

7. TAC attacks the area, ensuring that they provide coverage of the entire target area specified.

Pilots' Recommendations For Improving the Procedure

1. The scout should mark for TAC, whenever possible. It is easier for them to hit a point target than to adjust from the FAC's marking smoke.

2. The scout should have radio contact with TAC.

3. The scout should be allowed to stay close to the target area, so as to make a quicker BDA of the area and provide for remarking the target if required.

DIRECTING TACTICAL AIR COMMAND (TAC) AIRSTRIKES

Two-thirds of the pilots directed airstrikes. They derived their training from unit SOP's or from talking to and observing other pilots on-the-job, and in two instances, from FAC pilots. The majority of the pilots said it would have been helpful to have received relevant training before unit assignment, preferably in a formal program of instruction. Two-thirds of the pilots said that directing airstrikes is an essential scouting task. The FAC is responsible for directing airstrikes, but the scout can mark and describe the target and give BDA and fire adjustments more effectively than the FAC, who can direct the airstrikes if the scout marks the target. One comment was that "scouts are merely the element that provides target acquisition." The pilots disagreed on the question of whether scout pilots should be trained to direct airstrikes without the aid of an FAC aircraft. The majority said that the FAC could have directed airstrikes, but not as well, without scout support. The scout provides the reference information required to deliver pin-point fire support. Most pilots said the observer was not trained to direct airstrikes and did not need to be, because his job was to observe, not to direct airstrikes. One pilot pointed out that FAC aircraft have worked as gunships for the scouts in Vietnam.

INFORMATION PROVIDED IN DIRECTING AIRSTRIKES

Generally, scouts gave to the attack helicopter the same information that they would provide to the FAC, except to supply more tar-

get details; the scouts also recommended direction of approach, method of dropping the bombs, direction of the breakout, and location of bail-out areas.

DIRECTING ATTACK HELICOPTERS

Advantages of Scout Direction of Attacks

All pilots said they had directed attack helicopters. Approximately two-thirds of them said there was no basic difference between directing helicopter gunships and directing TAC. Pilot comments were: (a) they talked directly to, not through, the FAC; (b) they ad libbed more and the attack helicopters were usually more aware of the situation; (c) the attack helicopters were more effective in gunnery; and (d) the attack helicopters were better informed.

Information and Procedures in Directing Attack Helicopters

1. Give sufficient description to make sure the gunship identifies the target.

2. Recommend the appropriate weapon.

3. Know the attack helicopter armaments and their capabilities.

4. Recommend the most effective approach for the firing run.

5. Mark the target. If fire was received, the scout immediately marked the target area with smoke and the gunship usually attacked the area where smoke was dropped. If no fire was received, the scout made a marking run and marked the area he wanted the gunship to attack.

6. Inform gunship of the scout's holding position.

7. Clear the target area.

8. Adjust fire for the gunship and direct the attack if required.

9. After the gunship attack, the scout made a BDA.

10. If further fire support is needed to destroy the target, remark target, again clear the area, and adjust as required.

MEDICAL EVACUATION (MEDEVAC)

IMPORTANCE OF THE SCOUT'S MEDICAL EVACUATION DUTIES

The majority of the pilots said that performing medical evacuation (medevac) missions is a part of a scout pilot's job, although

a secondary part. The majority said that performing such missions did not interfere with the accomplishment of their primary mission, and that pilots should perform medevac missions when terrain considerations or lack of regular medevac aircraft make it advisable. It was pointed out that many places are accessible to scouts which are inaccessible to other aircraft. The majority of the pilots said they also directed and assisted medevac aircraft.

The pilots said that if the scout performs the medevac mission the observer should help load the wounded, apply minimum First Aid, and ensure that the wounded are secure after loading. The medical personnel should be alerted before they arrive and should be briefed on the situation and expected time of arrival. The name and unit of each casualty should be written down and the parent unit should be informed where the wounded are to be taken for treatment.

CRUCIAL DIRECTING AND BRIEFING INFORMATION

In directing and briefing medevac aircraft, the scout should include the following information:

1. Location of the enemy, weapons, and amount of fire to be expected
2. Equipment needed to evacuate the wounded
3. Extent and seriousness of the wounds. It should be determined whether the injured can be moved, whether a jungle penetrator or rigid litter can be used, and whether medical help is required on the ground
4. Ensure that medevac personnel have radio contact with friendly ground elements
5. Use the best approach to the landing zone (LZ)
6. Identify obstacles and barriers in the LZ
7. Give the location of friendly ground elements
8. Inform medevac aircraft of the security situation in the LZ
9. State the wind direction
10. Describe the terrain of the LZ, and if it is not practical to land, advise on the feasibility of using a McGuire rig
11. Know how close the LZ is to the wounded
12. Give the direction and distance of the wounded from the LZ
13. State the size and location of the LZ
14. Recommend a direction of departure from the LZ
15. Describe the friendly situation
16. Describe the enemy disposition

(NOTE: If the medevac aircraft mission was a sit down mission, medevac personnel were on their own after landing. Otherwise, the scout provided air cover for the medevac aircraft while it was on the ground.)

All pilots said that by directing the medevac aircraft they facilitated evacuation of the wounded by providing information that facilitated medevac movements and activities. The medevac pilot's morale improved when he knew he had cover support and was being briefed by a pilot who understood the situation. One pilot commented as follows: "In all cases, use your head and play them all as life and death."

Approximately two-thirds of the pilots said they received no training in directing medevac missions. Pilot responses were divided on the advisability of a formal medevac training program. All pilots said their observers were not trained to direct medevac missions and were divided on the advisability of giving them training.

EMPLOYMENT OF RECONNAISSANCE BY FIRE

SITUATIONS IN WHICH THE SCOUT EMPLOYED RECONNAISSANCE BY FIRE

1. Heavily held enemy areas from some portions of which no fire was being received

2. Bunkers and buildings

3. Any location suspected of concealing the enemy

4. Locations where signs of the enemy were plain, but where none were seen

5. Locations where enemy movement was heavy and recent, but well concealed

6. Free fire zones or other localities directed by the commanding officer or by the C&C aircraft

7. Situations in which the enemy would not fire

WEAPONS EMPLOYED IN RECONNAISSANCE BY FIRE

1. Aircraft Weapons Subsystem XM-27E1
2. M-16 or CAR 15 Individual Weapons
3. M-79 Grenade Launcher
4. M-60 Machine Gun
5. Grenade (white phosphorous, concussion, incendiary, smoke, CS)
6. Gunship Weapons
7. Artillery

RECOMMENDED FLIGHT PATTERNS

1. Successively reconnoitering by fire, move 180° to the other side of the target area, and reconnoiter by fire again.

2. In a two ship section wing, one aircraft covers the lead aircraft, only one aircraft firing at a time.

3. Pass over the area, set up a run along the long axis of the target area, use a slow rate of fire, break before the target, circle and let the doorgunner fire.

4. When the enemy is present, but in concealment, fire while hovering to make them think their positions are known.

PROCEDURES USED IN CONDUCTING RECONNAISSANCE BY FIRE

1. Use white phosphorous as this seems to make the enemy react.

2. Use M-79 and M-60 machine guns, firing short bursts.

3. Use reconnaissance by fire in dense foliage.

4. Drop grenades to obtain an air burst in the trees.

5. Fire M-79 grenade launcher to obtain an air burst in the trees.

6. Use M-60 machine gun against structures.

7. When using the XM-27E1 Weapons Subsystem, use grazing fire.

8. Maintain airspeed in case the enemy returns fire.

9. The scout should obtain information of the location of friendly ground troops.

10. Alert ground troops as to the scout's location and actions to be taken.

11. Employ reconnaissance by fire in an area from which fire has been previously received.

12. Never fire in the general direction of other aircraft.

13. Be aware of how much ammunition supply has been depleted.

14. Be sure there is clearance to fire.

15. Be sure not to endanger civilian personnel.

MARKING OF TARGETS

In marking targets most pilots indicated they most preferred grenades, then the M-60 machine gun, then the M-79 grenade launcher, the M-16 and CAR 15 individual weapons, and the aircraft weapons subsystem least. About half of the pilots said that when marking targets which were occupied or returning fire, they tried to avoid flying directly over the target center of mass. When the target was unoccupied or not returning fire, it made no difference.

ADAPTING MARKING METHODS TO THE SITUATION

1. When using a two scout aircraft team, one scout fires and the other marks.

2. Use terrain and airspeed to advantage; trying, if possible, to use suppressive fire during the marking pass. (Usually there is visual contact with the target.)

3. Come in low and fast, usually break left, then right, but make the maneuvers very gradual.

4. In hilly terrain, mark the target from the high side to keep the enemy from shooting down at the aircraft.

When receiving heavy fire, the pilots marked the target by going in very fast with as much suppressive fire as possible. Usually upon receiving fire, the observer immediately got out a marker and the

scout would adjust the gunship fire support from this marker. The immediate marker located the general target area. Usually the gunship could see the target location, and if not, the scout located it more exactly for him.

If enemy fire was extremely heavy, the scout would get as near as possible, drop a marker, then adjust fire support, using the marker as a reference.

PROCEDURES TO BE USED IN MARKING TARGETS

1. Fly low and fast.

2. Break down wind.

3. Hide behind terrain features if possible.

4. Use evasive maneuvers.

5. Use many axes of approach. Never approach twice from any direction.

6. Get the gunship to provide covering fire.

7. If equipped with the XM-27E1 Weapons Subsystem, use it, and the M-60 machine gun to provide suppressive fire.

8. Always maintain flight orientation and location of the target to be marked.

ACTION TAKEN ON RECEIVING ENEMY FIRE

Some pilots caught between mutually supporting anti-aircraft weapons considered it best to break directly over one gun so as to lessen the effects of the cross-fire. When the scout aircraft was equipped with the XM-27E1 Weapons Subsystem, the weapon was depressed 150° and fired, clearing a path in front of the aircraft as it broke out. Some pilots recommended using the terrain to maximum advantage in these situations and another pilot flew low to the ground between the weapons. Almost none of the pilots said they were aware of being tracked by radar controlled anti-aircraft weapons. The two pilots who were aware said that as soon as the sound was heard on the FM radio, they broke out and flew as low as possible, using the terrain to mask the aircraft.

PROCEDURES EMPLOYED WHEN FIRE IS RECEIVED

1. The normal procedure on receiving fire was to mark the target area at once, return the enemy fire, and move out of the target area. A gunship was always alerted to the fact that the scout had received fire and would provide fire support, if required. The pilot evaluated the situation and decided if he and the gunship could handle the situation, or whether to request additional support from the gunship platoon, aerial rocket artillery (ARA) or ground artillery units, tactical air, ground troops, etc. If the gunship was called in, the scout adjusted fire from his initial reference marker.

2. The scout aircraft on receiving fire should break, fly close to the treetops, and change direction if the terrain and enemy location enables him to do so. Often the enemy would lead and fire, anticipating a right break. The pilot should not be forced into moving in only one direction because of the terrain or enemy positions after taking fire, but should increase the number of options available for maneuvering to make the enemy less likely to anticipate the scout's movement correctly.

RULES THAT GOVERN ACTION WHEN FIRE IS RECEIVED

1. Do not pull pitch, fly low returning fire.

2. Always vary direction of flight toward the target.

3. If the target is personnel and the scout has the advantage, try to destroy them so that it will not be necessary to return.

4. If the target is heavy weapons, fly low and use evasive maneuvers.

5. If small arms fire is received, gain altitude to avoid it.

6. Return fire immediately to neutralize or destroy.

7. Practice the required coordination between the gunship and the scout aircraft. Each should know exactly what is to be done and how to do it.

8. Use trees and terrain that the scout has already noted to screen his evasive action.

9. Check at once to see if the aircraft has taken hits.

OBSERVER DUTIES ON RECEIVING FIRE

1. Throw target marker at once on receiving fire. The observer normally carries a smoke grenade, with the pin straightened and hooked to his weapon, to expedite getting the marker thrown quickly.

2. Return enemy fire.

3. Tell the pilot what is happening.

4. Locate the target on the map when the aircraft is out of range of enemy weapons.

ACTIONS TO TAKE IF THE AIRCRAFT RECEIVES HITS

1. Check the instruments.

2. Check control movements.

3. Ask the gunship to look the aircraft over for damage.

4. Continue the mission if possible.

5. Land in a secure area as soon as possible, and check the aircraft for extent of damage:

   a. Land at the nearest fire base or friendly location.

   b. Get back to base by the safest route.

   c. Alert the friendly ground troop to secure the LZ, if the troop is close enough.

AIR MOBILE COMBAT ASSAULTS WITH INFANTRY

Approximately two-thirds of the pilots said they directed combat assaults as scout pilots. The same number had received training in this combat activity at Flight School or in their unit. They said that such training should be included in a formal training program.

The scout pilots said they usually selected the LZ for the air mobile insertion of the infantry.

FACTORS TO CONSIDER IN SELECTING A LANDING ZONE (LZ)

1. Enemy situation, strength, weaponry, etc.

2. Size of the LZ including the number of aircraft that can occupy the LZ at one time.

3. Suitability of the LZ for air mobile elements.

4. Obstacles and barriers in the LZ.

5. Type of neighboring terrain.

6. Wind direction.

7. Location of the LZ and its distance from the objective.

8. Flight paths in and out of the LZ.

9. Amount of time available before insertion.

10. Surface cover in the LZ.

11. Cover in and around the LZ.

12. Number of aircraft that will occupy the LZ.

KNOWLEDGES AND PROCEDURES REQUIRED IN DIRECTING AIR MOBILE OPERATIONS

1. Know the mission of the insertion unit.

2. Provide recommendations for suppressive fire.

3. Know whether ground to air fire is expected.

4. Mark the LZ for the lift aircraft.

5. Establish radio contact after the infantry is inserted.

6. Inform the air mobile elements of everything observed that might possibly be helpful.

7. Know the location of the ground unit commander and be familiar with his SOP.

8. Know the direction in which the ground troops will move.

9. Tell the lead aircraft to notify the ground commander of the location of the objective in relation to the aircraft.

10. Tell the ground commander both the azimuth and the distance to the objective and the type of terrain over which his troops will have to move.

11. Provide suppressive fire for the lift aircraft.

12. Sometimes the scouts and somestimes the gunship requested artillery preparation for the LZ.

INSERTION OF RANGER FORCES

Approxiamtely a third of the pilots said they had directed insertion of Ranger Forces. Much of the knowledges and many of the procedures needed for insertion of Ranger Forces are the same as those required for the insertion of the Air Mobile Forces. A list of required information and procedures follows:

1. Know the locations of both primary and secondary LZs before taking off on a mission.

2. Brief the insertion team on enemy activities.

3. Provide the lift aircraft cover both going in and coming out.

4. Advise the lift aircraft as to the best landing azimuth.

5. Avoid dropping a smoke marker in the LZ so as not to alert the enemy.

6. Establish radio contact with the team after it is inserted.

7. Once the team is inserted, move out of the area quickly.

8. When selecting an LZ, use the same procedures used for inserting Air Mobile Forces.

Few of the pilots said they had received training in this type of operation and said such training should be formally provided.

PERFORMANCE OF CONVOY COVER

The majority of the pilots said they performed convoy cover missions. Approximately two-thirds of them said they received no formal training on how to perform convoy cover missions, and the pilots were not agreed as to whether training should be conducted or

whether the skills could be learned on-the-job. They reported no appreciable difference in methods and techniques of operation, regardless of the composition of the convoy; e.g., combat vehicles, supply and combat vehicles, all wheeled. If there were no heavy combat vehicles the scout operated closer to the convoy. The method of operation was basically the same as that for any other type of reconnaissance, except that the zone was small and narrow. They said it was similar to route reconnaissance. They usually gave 360° support and acted as the convoy cover. Some pilots paralleled the route on one side, then on the other; others flew in circles interspersed with figure eights. The pilots mentioned altitudes of from 20 to 50 feet, and an airspeed of 60 knots. They reconnoitered as far ahead as possible.

INFORMATION AND PROCEDURES REQUIRED FOR PERFORMING CONVOY COVER MISSIONS

1. Maintain radio contact with the lead and trail vehicles.

2. Know what fire support capabilities are available.

3. Ensure that high ground along the route is well reconnoitered.

4. Remember to reconnoiter the rear of the column.

5. Do not get over engrossed in moving ahead of the column, because the flanks are important.

6. Check close to the route, also away from the route.

7. Inform the convoy commander whenever a vehicle falls out.

8. Inform the convoy commander of column progress.

9. Keep the convoy commander informed as to spacing of the vehicles and on possible bottlenecks in the route.

10. Inform the convoy commander of all important items observed:

    a. Bridges and river crossing sites
    b. Prominent terrain features that dominate the route
    c. Obstacles and barriers along the route
    d. Bunker holes, spider holes, and mines along the route

11. Normally, fire support is handled by the gunship, but the scout should be prepared to request and adjust fire as required.

12. Inform the convoy commander of potential ambush sites.

13. When an ambush becomes active:

    a. Give the column all the volume of fire support available
    b. Mark the enemy positions
    c. Call in the gunship

(NOTE: One pilot commented, "Once the column is hit, all vehicles should move out of the killing zone. Most convoys I saw ambushed just sat and tried to shoot it out, resulting in more damage.")

PILOT COMMENTS ON OBSERVER DUTIES DURING CONVOY COVER MISSIONS

1. Observes

2. Mans the weapons

3. Marks the targets as required

4. Plots the progress of the convoy on a map

5. Warns the convoy of potential enemy locations

PROCEDURES USED DURING OPERATIONS WITH GROUND ELEMENTS

1. Identify the positions of ground elements from altitude before operating at low level.

2. Obtain visual contact with each ground element while operating at low level.

3. Identify each ground element by call sign and maintain radio contact.

4. Ask the ground element for known enemy locations.

5. Ask the ground element what type of weapons the enemy are using.

6. Determine how fast and in what direction each ground element is moving.

7. Watch for possible enemy ambushes.

8. Determine possible enemy escape routes, and inform the ground unit commander.

9. Mark targets for the ground elements.

10. Direct fire support for the ground elements.

11. Advise the ground commander as to the possible advantageous maneuvering of his troops.

12. Perform reconnaissance close in to the position of the ground elements.

(NOTE: The scout must be aware that noise from the aircraft may detract from possible detection of the enemy when operating too close to ground elements. Often the radio operator on the ground cannot hear the scout radio transmission because of the noise if the scout is too close.)

13. Keep the ground elements informed of of the scout's location while he is operating close to them.

(NOTE: Normally, the ground elements can see the scout, but it is best to keep them informed tc keep from getting caught in their fire.)

14. The scout can use the aircraft as a visual reference in directing troop movement, or in adjusting their fire on enemy positions.

15. When operating in thick foliated areas the scout can lead the ground troops by dropping a series of smoke grenades to guide their advance.

16. The scout may have to request and direct medevac service for the ground elements.

17. Give the ground troops BDAs when fire is used to support their operations.

18. Advise the ground commander as to possible night camp locations.

19. Give the resupply aircraft the location of the LZ when requested and help to direct it to the LZ.

20. Tell the ground commander what preparations are to be performed on the LZ for the resupply aircraft.

21. Find out if the ground elements have worked with air elements.

(NOTE: Such information is helpful to the scouts if the ground troops are familiar with aircraft capabilities.)

PROCEDURES USED DURING LINK UP OF GROUND TROOPS

None of the pilots said they had received any formal training in link up of ground elements. Responses were divided on whether previous training would have made the job easier. The pilots reported that all

but two of their observers received such training on-the-job.

All but one pilot reported that link up of ground units is a part of scouting. All but two pilots had performed this type of operation with infantry type units. (The essential principles would also apply to Armor units.) The essential procedures are listed below:

1. The two elements to be linked should be on the same radio frequency. One element moves while the other remains stationary and establishes a defensive position. If both elements must move, stop one element when the two have reduced the distance between them, then have only one element move until link up occurs.

2. Give each unit the best route to use, a direction of March, and a prominent terrain feature to use as a reference point. The scout should screen for each unit and help them locate the enemy, and in this way can prevent their firing on each other.

3. Establish the location of the lead element. After positively locating both elements, give the magnetic azimuth and distance to the other.

LOW LEVEL FLIGHT

OPEN AREAS

Pilot Experience in Flying Over Open Areas

All pilots said they tried to avoid flight over open areas. They said that when they did fly over open areas their airspeeds ranged from 40 to 100 knots, the average airspeed being approximately 77 knots, and often all of them flew as low as possible to the terrain in order to avoid fire at altitudes ranging from several feet to 50 feet. One pilot said he flew at treetop level so he would not have to make a cyclic climb out of an area if his aircraft was hit. All the pilots said the chance of receiving hits was greater in open areas.

Procedures Recommended for Flight Over Open Areas

1. Fly fast and make large turns. Do not spend much time in one area.

2. Make an erratic flight path at 40 to 60 knots.

3. Never fly in a straight flight path.

4. Flying at low altitude some pilots preferred to fly high over an open area, using a zig-zag pattern.

5. Reconnoiter the outside of the open area first, then reconnoiter a small section of it, then another, until the whole area has been covered.

6. Fly at high altitude first, reconnoitering for anything significant, then fly at low altitude (less than 20 feet).

FLIGHT OVER MOUNTAINOUS OR HILLY TERRAIN

Dangers of Flying Over Hills and Mountains

The pilots were divided about whether flying in mountainous or hilly terrain is more or less dangerous than flying over flat, heavily foliated terrain. Some general comments about mountainous or hilly terrain were:

a. Enemy fire may come from many places.

b. The wind is usually bad, with up and down drafts.

c. If a target is missed the aircraft is exposed to fire from above.

d. Pilots must fly under high density altitude conditions.

e. Fewer forced landing areas and fewer areas suitable for pick up of downed crews are available over such terrain.

f. It takes more power to reconnoiter effectively, and more power to get to the top of any terrain feature so there is danger of crashing into the hill.

g. Such flights require greater technical skill of the pilot.

Procedures Recommended for Mountainous or Hilly Terrain

1. Stay close to the terrain.

2. Fly against the wind.

3. Reconnoiter the high ground first.

4. Keep a relatively high airspeed.

5. Fly so as to keep the observer positioned next to the mountain or hill, so that if enemy fire is received the observer can quickly retaliate with suppressive fire.

6. Check the ridge lines first so that if fire is received the scout can return fire on the run. Do not get caught in the position of taking hits downward through the aircraft.

7. Climb mountains at 45°, spiraling to the right.

8. Hovering is usually required when reconnoitering this type of terrain.

9. In approaching a hilltop, fly a little higher because of turbulence.

FLIGHT ALONG RIDGE LINES, TREE LINES AND WATERWAYS

Procedures Recommended for Reconnoitering Ridge Lines

1. Use an erratic flight path (zig-zag) over the top of the ridge line.

2. Fly above the ridge, not to the side.

3. Reconnoiter the top of the ridge first, then work downhill, criss-crossing the ridge line.

4. Look for high speed trails and follow them in the direction of travel, depending on recent usage.

5. Keep the left side of the aircraft toward the hill so that the observer can return fire immediately.

6. Keep a relatively high airspeed until the area is well reconnoitered.

7. Use a series of S turns.

8. Follow the contours while reconnoitering downward from the ridge line.

Procedures Recommended for Reconnoitering Tree Lines

1. Stay over the trees and reconnoiter them first.

2. Always predetermine a way to find cover if fired upon.

3. Never fly along tree lines.

4. Fly approximately 20 meters into the tree lines with the observer side of the aircraft nearest the tree line.

5. With a two aircraft scout team, make left turns with the wing aircraft in a right echelon to ensure a deeper reconnaissance of the trees.

6. Use reconnaissance by fire.

7. Do not give the enemy an open shot by going in front of the tree line.

8. Use circular or zig-zag patterns.

Procedures Recommended for Reconnoitering Riverways

1. Check prominent terrain features or lines of riges before descending to check the waterway.

2. Use the same reconnoitering techniques as for tree line reconnaissance.

3. With a two aircraft scout team, use one aircraft on each side of the river and the same reconnoitering techniques as for route reconnaissance.

4. Use right hand turns, S turns, and zig-zag flight patterns.

Procedures Recommended for Reconnoitering Heavily Wooded Areas

1. Fly close to the treetops at an airspeed of from 20 to 60 knots.

2. Fly slow at treetop height and below treetop height if possible.

3. Use slow, tight turns and observe straight down.

4. Fly low and fast to see if the enemy will give away their positions, then slow down as necessary to reconnoiter thoroughly.

5. Use reconnaissance by fire; if nothing appears, then hover as necessary.

6. Fly over heavily wooded areas constantly at low altitudes and low airspeeds.

7. Use right turns, zig-zag, and circular flight patterns.

PILOT COMMENTS ON HOVERING AND THE DANGERS OF HOVERING DURING LOW LEVEL RECONNAISSANCE

The pilots were asked if they thought hovering is an absolute requirement in performing reconnaissance. The pilots were divided on this question. Some general comments follow:

1. It is better to see the enemy the first time than to come back, because the second time the enemy may be ready.
2. Hovering depends on the terrain and foliage.
3. If cover is heavy, hovering is required.
4. Hover only when it is absolutely necessary.
5. Never hover.

The pilots reported the following hazards of hovering at low airspeeds during reconnaissance:

1. Hughes Tail Spin may occur, usually when the aircraft is overloaded, and when the craft is in high density altitude situations.
2. A hovering aircraft is a good target and the enemy has more time to fire.
3. It takes more power to hover and it is easy to over-torque the aircraft if it is receiving power.
4. The aircraft has no lifting power.
5. The aircraft is unable to perform an autorotation.
6. There is a chance of engine failure.
7. It takes longer to get out of the area.
8. There is a loss of maneuverability.
9. The aircraft is more susceptible to wind shifts.
10. Hovering often requires a pilot technique that inexperienced pilots have not yet acquired.
11. The pilot may form the habit of concentrating on the ground, instead of flying the aircraft.

PROCEDURES USED TO AVOID ENEMY FIRE ON CONTACT

1. Work with the sun at your back whenever possible.

2. Never fly exactly the same pattern twice.

3. Stay low and use evasive maneuvers as often as possible.

4. Use a high speed approach on starting reconnaissance.

5. Never make an abrupt maneuver back toward a possible enemy location.

6. Climb, if necessary, after establishing airspeed.

7. Use terrain features to maximum advantage to screen the aircraft maneuvers.

8. Work against the wind if possible.

GEOGRAPHICAL ORIENTATION DURING FLIGHT

Approximately two-thirds of the pilots said their observers did not play an important role in keeping the pilot oriented during flight. Six pilots said they could have done as well in low level navigation without an observer. Approximately half of the pilots said their observers were proficient in basic map reading skills. The pilots were divided on the observers' proficiency in giving grid coordinates, and said that in situations in which the scout aircraft gave the target grid coordinates the pilot usually did so. In some units the gunship or the C&C aircraft usually located the target grid coordinates. The majority of the pilots said that target locations should be reported accurately within 50 meters; a smaller group said to within 100 meters.

The pilots said that they detected 50% of the targets without observer aid and that the observer detected 50% of the targets. Seven pilots said their observers were proficient in geographical orientation.

GEOGRAPHICAL ORIENTATION SKILLS NEEDED

1. Awareness of location and direction
2. Knowledge of the area of operations
3. Ability to read the radio magnetic indicator quickly
4. Ability to read the magnetic compass quickly
5. Recognition of landmarks
6. Map reading skills
7. Ability to perform a good map reconnaissance before the mission
8. Ability to keep aircraft position oriented on a map from the start of the mission, and skill in staying ahead of the actual flight location

PROCEDURES RECOMMENDED FOR MAINTAINING GEOGRAPHICAL ORIENTATION

1. Use the radio magnetic indicator
2. Know the locations of prominent terrain features (roads, rivers, etc.)
3. Know the locations of fire support bases

4. Use check points
5. Maintain gunship orientation for the scout aircraft
6. Make a map reconnaissance before the mission
7. If a two scout aircraft team is in operation, have one aircraft at a slightly higher altitude than the other

EMERGENCY FLIGHT INDICATORS

SITUATION A

The aircraft is unable to return to the base of operations because of aircraft damage or malfunction. What factors and indicators are used in making a decision to land the aircraft?

Indicators Given by Pilots

1. Response of aircraft to control movements
2. Damage to the transmission or sling rotor blades may make it necessary to land
3. Instruments are in the green or red
4. Lighting of the warning lights
5. Smoke from the engine
6. Wild fluctuations of the instrument indicators
7. Decrease in engine power
8. Engine noises
9. Rise in oil temperature
10. Drop in oil pressure

Other Factors Considered

1. Advice from the crew chief
2. Problem of finding an appropriate landing place
3. Enemy situation
4. Nature of the terrain between the aircraft and a good forced landing area
5. Position and distance of friendly ground elements
6. Distance from the base or other secure area

SITUATION B

The aircraft has sustained damage or had a malfunction. What factors and indicators are used in making a decision to fly back to the base of operations?

Indicators Given by Pilots

1. The pilot is positive the aircraft has developed a small problem
2. Response of the aircraft to control movements
3. Instruments are in the green
4. Extent of the damage, vibration cues, sound, smell
5. Stability of the instrument indicators
6. Loss of power at a given airspeed and altitude
7. Readings of the fuel gauge; change in readings may indicate a leak
8. Rise of engine oil temperature
9. Fall of engine oil pressure
10. Rise of engine exhaust temperature
11. Extreme high frequency vibration, indicating a problem with the tail rotor or the tail rotor drive system
12. Damage shown by warning lights; e.g., OH-6A chip detect lights indicate damage to the transmission

Other Factors Considered

1. Advice from the crew chief and crew
2. Advice from the supporting gunship or other scout aircraft
3. Time required to get back to base
4. Distance to a secure area
5. Enemy situation

MISCELLANEOUS TOPICS

AVIATION GAS MASK

Approximately a third of the pilots said they used the aviation gas mask in situations in which CS (tear gas) canisters were dropped in large quantities and the scouts went in to reconnoiter to observe the effect of the gas on the enemy, if any were present. A third of the pilots said they had been trained to use an aviation gas mask during performance of normal flying duties; the rest said they had received no such training. One pilot said that, "the observer, under present regulations, is not qualified to fly the aircraft while the pilot puts on his mask." The pilot would have to find a landing place in order to put it on, or start the mission with it on. Only three pilots said that gas mask training should be given, one pilot qualified his response by stating, "only if it is to be extensively used."

AIRCRAFT REFUELING KIT AND FIELD REFUELING OPERATIONS

Approximately half of the pilots said they participated in refueling operations using the aircraft refueling kit. General rules governing refueling, including hot fuel procedures, should be followed.

AIRCRAFT WEAPONS

The pilot should be able to operate, clean, disassemble and assemble, and troubleshoot all weapons used in the scout aircraft. The observer should carry spare parts for the M-60 machine gun.

INFANTRY AND ARMOR UNIT TACTICS

The scout pilot should thoroughly understand basic tactics at least through company level, battalion level if possible. Training should cover unit strength (manpower), equipment, weapon capabilities, mobility and firepower capabilities.

AEROSCOUT OBSERVER RESPONSES TO THE AIR CAVALRY TACTICAL INFORMATION SURVEY

GENERAL BACKGROUND INFORMATION

The aeroscout observer sample was drawn from units at Fort Rucker and Fort Knox. All the observers interviewed had combat experience in Vietnam.

Fifteen observers were interviewed and their background information is presented in Table 5.

TABLE 5

Average Military and Observer Experience (N=15)

Time in service - 4 years, 10 months
Time in service as an aeroscout observer - 10 months
Time as an aeroscout observer in combat - 10 months

The sample included representative from all four Corps (geographical areas of Vietnam), including Cambodia. Three observers served as such in non-combat as well as in combat units. The majority of them before becoming aeroscout observers had served in job assignments in aircraft, usually as helicopter repairmen or doorgunners. Also, the majority of them said they volunteered as observers for the following reasons:

1. Liked flying
2. To be able to be on flight status
3. Interesting job
4. Excitement of the job
5. To do a job no one else wanted to do
6. More action in performing the job
7. Liked the assignment and the personnel
8. To do his share of the fighting

Eleven observers said they flew in the OH-6A scout aircraft. One said he flew as an observer in an OH-13 aircraft, and another in the OH-58. The others said they flew in Huey helicopters as observers. Only three said they had received job training as an observer before being assigned to their job. Thirteen said they now possess the ability to fly a scout helicopter, all said they had received their training on-the-job in Vietnam. Six reported having to take control of the aircraft during a mission because of pilot injurt. All but one said they felt it was absolutely essential that the observer have minimum flight skills so that he could take over the aircraft in an emergency.

Two-thirds of the observers said they used the "side scan" method of searching for targets. This is the scanning method described in TM 1-380-2, "Visual Search."[1] One observer said he would observe approximately 1000 meters in front of the aircraft and to one side. Another reported searching for targets by looking for irregularities in the terrain.

Two-thirds of the observers said they received no training in recognition and identification of enemy equipment, uniforms, etc., before being assigned as an observer. They said this lack of training made the job more difficult.

FACTORS THAT FACILITATED TARGET DETECTION

1. Movement, especially very quick movement
2. Particular shape (especially man-made)
3. Recognition of the object
4. Contrast with terrain background
5. Ground to air fire
6. Brights objects and reflections
7. Muzzle flashes
8. Sounds of firing
9. Fresh dirt
10. Smoke
11. Color of objects
12. Knowledge of terrain and normal locations for targets
13. Ability to recognize indicators of recent movement

TARGETS MOST DIFFICULT TO DETECT

1. Targets in heavy foliage
2. Bunkers
3. Cave emplacements
4. Well camouflaged equipment and weapons
5. Fighting positions
6. Enemy personnel
7. Gun emplacements; automatic weapons, rockets, and mortars
8. Foxholes
9. Small objects
10. Caches
11. Footprints

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[1]Department of the Army. "Aerial Observer Programed Text - Visual Search," TM 1-380-2, 14 October 1966.

TARGETS AND TARGET INDICATORS EASIEST TO DETECT

1. Targets in the open
2. Moving targets, such as vehicles and troops
3. Fresh trails through rice fields, grass, or marshy terrain
4. Sampans and boats
5. Enemy living quarters
6. Enemy base camps
7. Enemy staging areas
8. Poorly camouflaged enemy positions
9. Stream crossings
10. Objects which are reflecting light
11. Bunkers
12. Fighting positions

FACTORS THAT FACILITATED TARGET DETECTION OF CAMOUFLAGED TARGETS

1. Enemy personnel moving under or around the camouflage
2. Camouflage that is obtrusive; e.g., different type of foliage rather than blended with same types of foliage
3. Oddly shaped targets
4. Well used trails leading to the target
5. Difference in color contrast with background of old camouflage
6. Movement
7. Camouflage where it normally would not be
8. Targets exposed by rotor wash
9. Unusual terrain configuration
10. Unusual shapes caused by use of too much camouflage

A statement common to pilots and observers was that, "when first performing visual reconnaissance in combat, it takes a given amount of actual combat flying to obtain their 'observer eyes'." The observers were asked: "When you first started to perform visual reconnaissance, what was the main reason you could neither detect nor recognize targets?" The main reason given was that they knew neither where to look, nor what to look for. They also said they flew too fast when they were learning how to perform visual observation from an aircraft, and needed to get accustomed to flying at low levels. They also said there was too much to look for all at once when first performing visual observation from an aircraft. About a third of the observers said they saw the target shape but could not identify the target.

One observer said his major problem was being unable to interpret signs of the enemy. Another said it was difficult to discriminate between friendly ground troops and enemy personnel, especially in heavy foliage and undergrowth. The observers were divided on whether they detected most of the targets the first time they flew over an area or whether additional passes were needed.

MOTION SICKNESS DURING LOW LEVEL OBSERVATION

Factors Contributing to Motion Sickness

1. Eating in a hurry before a mission
2. Looking directly down (fixation of vision)
3. Loss of horizon
4. Apparent motion of the ground as it seems to rush toward the observer
5. Sudden changes in altitude and attitude of the aircraft
6. Continual shifts in the direction of flight in sharp turns with the aircraft out of trim
7. Looking straight up
8. Looking at the sky and tree line when the aircraft is in rapid motion down among trees

Techniques for Easing or Avoiding Motion Sickness

Eight observers said they suffered no apparent motion sickness. Some techniques they used to nullify or prevent motion sickness were:

a. Performing the scanning task methodically
b. Did not fixate vision when observing downward
c. Looking toward the horizon frequently
d. Not eating before a flight
e. Moving with the motion of the aircraft
f. Paying full attention to the job to be performed
g. Scanning the entire area (at least at times) rather than a small section of it

RECOMMENDATIONS FOR A TARGET DETECTION TRAINING PROGRAM

1. Realistic training, with use of actual targets of the types that would normally be encountered in a combat environment.

2. Flight training thorough enough for the observer to become accustomed to viewing at low levels and high speeds.

3. Increased emphasis on practice in detection of camouflaged targets.

4. Increased emphasis on practice in detection of targets in dense foliage and undergrowth.

5. Increased training in recognizing shapes of many kinds of enemy targets.

6. Training in recognizing types of traps used by the enemy. This would include recognizing terrain configurations which lend themselves to either channelizing the flight path of the aircraft or to particular patterns of gun emplacements used by the enemy.

Three observers said they used stabilized image binoculars and said these were a hindrance because the aircraft was not stable enough to detect targets. Movement of the aircraft accentuated the apparent motion of the ground as seen through the binoculars, which offered too narrow a field of view. After the target had been detected the binoculars were of some use in identifying it.

FIRE SUPPORT ADJUSTMENT

Approximately a third of the observers had received training in aerial adjustment of artillery before being assigned as observers. Two-thirds had received no such training. A third of them said they adjusted artillery fire as a normal part of their job as an observer. Those observers who did not gave the following reasons: (a) adjustment of artillery fire was performed by the gunship and the C&C aircraft; (b) it was not part of the observer's job; (c) the pilot was trained to do this job and had more experience; and (d) artillery was seldom used, except in preparation for reconnaissance, or before moving troops into an area.

DIFFICULTIES RELATED TO ADJUSTING ARTILLERY

1. Following proper radio procedures in requesting fire support
2. Adjusting fire at treetop height
3. Establishing the target location from a map
4. Adjusting fire accurately

TRAINING AND BRIEFING COMMENTS

None of the observers received training in adjusting naval gun fire.

Approximately a third of the observers said they had received training in adjustment of tactical airstrikes in Vietnam through experience on-the-job, or from scout pilots and Air Force personnel.

Adjusting airstrikes, which they said was much the same as adjusting direct fire, was easier than adjusting artillery and naval gun fire. Four observers said they briefed the FAC aircraft, and used a normal spot report type of briefing for this purpose.

DISMOUNTED RECONNAISSANCE

Approximately a third of the observers performed dismounted reconnaissance, chiefly to retrieve enemy equipment, documents, or other items of an intelligence nature. They also reconnoitered bridges, roads, obstacles, defiles, and minefields. A gunship or second scout aircraft provided air cover for security while the observer was dismounted. If the aircraft had a doorgunner he would also provide fire cover if necessary.

MAP READING AND AERIAL NAVIGATION

ESSENTIAL MAP READING SKILLS

1. Interpretation of map symbols and colors
2. Reading of contour lines and determining elevation
3. Reading grid coordinates (8 digits)
4. Recognition of types of terrain and terrain features, man-made structures, and roads
5. Use of intersection
6. Use of checkpoints in aerial navigation
7. Use and construction of a map overlay
8. Use of the road legend on a map
9. Orientation of a map
10. Navigation by use of compass and terrain features
11. Procedures for recording and updating map information
12. Maintaining accurate geographical orientation at all times
13. Interpolation of the aircraft compass heading to a map direction to determine location

ESSENTIAL AERIAL NAVIGATION SKILLS

1. Use of the radio magnetic indicator
2. Use of the magnetic compass
3. Radio communication procedures for giving aircraft location
4. Recognition of terrain and terrain features
5. Procedures in using the guard emergency radio frequency
6. Operation of the aircraft radio communication equipment
7. Procedures for coordinating the gunship or other scout aircraft in performing aerial navigation
8. Essential elements to look for in performing a map reconnaissance prior to the mission
9. Procedures for keeping the map oriented during flight

MISCELLANEOUS

Accuracy in determining the aircraft's geographical location during flight is an important aspect of aerial navigation. In reporting how accurately the job had to be done the observers said within 500 meters during flight, within 100 meters during fire control, and less than 50 meters in adjusting fire support with friendly ground troops. In estimating direction of flight they said they estimated within $\pm$ 10 degrees.

Approximately half of the observers said they did not always make a map study of the objective area before a mission, chiefly because they flew over the same area daily and got to know the vicinity extremely well.

The map scale reported as best to use was 1:50,000, 1:25,000 being their second preference. Three observers had some experience in using aerial photographs as a supplement for topographical maps, the others said they did not use aerial photographs.

Four observers said they always gathered information to update their maps, nine observers said they did not do so. Changes were usually made by marking the maps, using their own personal legends. Approximately half the observers said they did not always plot targets or potential LZs on their maps. Some reported that the gunship or C&C aircraft did this job.

AIRCRAFT MAINTENANCE

DUTIES OF THE OBSERVER IN PERFORMING MAINTENANCE

1. Maintenance of the XM-27E1 Weapons Subsystem
2. Maintenance of all individual weapons
3. Daily inspection, First Echelon
4. Organizational maintenance
5. Refueling
6. Providing the crew chief with help as required
7. Maintenance of the Armed Weapons Subsystem
8. Conduct of pre and postflight inspections

(NOTE: Some observers acted as the crew chief for the aircraft and performed both jobs.)

MAINTAINING MAINTENANCE FORMS

1. Form #2408-12 Army Aviator's Flight Record
2. Form #2408-13 Aircraft Inspection Maintenance Record

3. Form #2408-14 On Correct Fault Record
4. Form #2408-15 Historical Record for Aircraft
5. Form #2407 Maintenance Request
6. Form #2407-1 Maintenance Request Continuation Sheet
7. Daily Log Book

AIRCRAFT SAFETY AND HANDLING PROCEDURES

1. Never smoke around the aircraft and during refueling
2. Stay clear of the XM-27E1 and XM-8 Weapons Subsystems
3. Stay clear of the rotor blades while the aircraft is in operation
4. Keep everyone but the aircraft commander out of the aircraft during refueling
5. Check all weapons to be sure they have been cleared
6. Be careful not to handle the flight controls
7. Make sure the aircraft has been grounded
8. Handle all grenades in the aircraft with extreme care
9. Check to make sure that the fuel shut-off switch in in the OFF position while the aircraft is on the ground
10. Observe all fire safety procedures
11. Be perfect in understanding and giving all arm and hand visual signals used in handling the aircraft on the ground
12. Follow proper procedures for handling of all ammunition and demolitions

MAINTENANCE OF AIRCRAFT WEAPONS

1. Maintenance of the XM-27E1 Weapons Subsystem includes:

    a. Installation and removal
    b. Cleaning
    c. Disassembly and assembly
    d. Troubleshooting
    e. Loading and unloading
    f. Boresighting
    g. Test firing

2. Maintenance of individual weapons, M-60 machine gun, M-16 rifle, CAR 15, and caliber .45 pistol includes:

    a. Disassembly and assembly
    b. Maintenance
    c. Loading and unloading
    d. Troubleshooting

TARGET ENGAGEMENT

COMBAT SITUATIONS IN WHICH THE OBSERVER EMPLOYED HIS WEAPON

1. Aircraft reception of enemy fire
2. Reconnaissance by fire

(NOTE: The observers cited the situations above as the two in which the observer was most often required to use his weapon.)

3. Presence of enemy personnel in the open
4. Performance of air security for a downed aircraft
5. Evacuation of wounded personnel by sling extraction
6. Conduct of gun runs on a target

TARGETS ENGAGED MOST FREQUENTLY

1. Bunkers
2. Buildings (hooches)
3. Troops (moving and stationary)

(NOTE: The observers cited these three targets as those most commonly engaged.)

4. Sampans
5. Muzzle flashes
6. Convoys

METHODS OF FIRING FROM THE AIRCRAFT

(NOTE: Some observers used the M-16 rifle, others the M-60 machine gun.)

1. Quick fire method
2. Firing from the hip
3. Pointing method
4. Use of tracers to adjust fire
5. Firing on automatic

The observers said they most often engaged targets at airspeeds as slow as an average of 21 knots to as fast as an average of 55 knots. The observers said they fired most often at a 45° angle downward at oblique distance of from 275 to 725 meters.

RADIO COMMUNICATION

Two-thirds of the observers monitored the radio for the pilots at all times, the other third said they did not do this job. Four observers said they had to use crypto devices. The most frequent type of radio communication the observers made was the spot report.

NIGHT OBSERVATION

Approximately a third of the observers said they used image intensification devices in making observation. While the aircraft was operated at low speeds and altitudes they normally scanned a small area at a time, and used two types of night vision devices; the infrared weapons sight and the starlight scope. The predominant signs of the enemy indicators at night were muzzle flashes, campfires, and reflections or flashes of light.

AIR CAVALRY TACTICAL CONSIDERATIONS

TACTICAL INFORMATION ESSENTIAL FOR OBSERVERS

1. Type of area of operations, whether or not free fire. Any and all area information
2. Enemy situation in the area of operations
3. Tactical operations of a hunter-killer team
4. Methods of employment of scouts and ground troops
5. Methods and techniques of target engagement
6. Disposition of ground elements
7. Methods and techniques of target detection
8. Methods and techniques of low level scouting
9. Methods and techniques of insertion of ground troops; use of the aerorifle platoon
10. Extraction of ground troops and wounded personnel
11. Employment of scouts in night and route reconnaissance missions
12. Employment of scouts in coordination with ground troops

INFORMATION REQUIRED IN WORKING WITH GROUND TROOPS

1. Knowledge of ground troops' locations at all times
2. Familiarity with uniforms they are wearing
3. Knowledge of unit identification which would include: methods of identification of their elements, color of smoke, or any other visual method of identification

4. Knowledge of what weapons they are using
5. Knowledge of communication, frequencies, and call signs
6. Knowledge of their direction of movement
7. Know their mission
8. Knowledge of personnel strength
9. Procedures for adjustment of artillery or aerial rocket fire support
10. Code methods for directing ground movement
11. Methods and procedures for directing ground elements
12. Safety margins required for fire support

PREFLIGHT PROCEDURES

1. Make a preflight inspection to ensure that the aircraft is ready.
2. Check the weapon systems.
3. Obtain a copy of the radio frequencies to be used.
4. Obtain a report of current weather conditions.
5. Make a map study of the area of operations.
6. Help develop the flight plan.
7. Obtain intelligence information concerning the area of operations.
8. Provide input for selecting the checkpoints and flight route.

BRIEFING AND DEBRIEFING PROCEDURES

INFORMATION TO BE PRESENTED IN A MISSION BRIEFING

1. Area of operations; terrain, enemy activity, previous reports and activities
2. Type of targets and weapons to expect
3. Size of the enemy force
4. Location of friendly ground elements
5. Call signs and frequencies of all participating units
6. The mission and its duration
7. Weather conditions
8. What to expect and what to look for
9. Emergency frequency
10. Results of map reconnaissance, including locations of bunkers if marked or known, buildings, and trails

INFORMATION TO BE PRESENTED IN A DEBRIEFING

1. What was accomplished and what was seen and done
2. What could have been done to improve the mission
3. Current enemy activity in the area
4. New and old trails discovered
5. Route used in the mission
6. Changes in the area since the last mission through it, including changes in the terrain
7. Presentation of a map overlay showing any relevant information
8. Updating of the map as required
9. What went right or wrong
10. What was missed
11. What other scout teams sighted

MISCELLANEOUS

The observers reported little or no use of navigational charts, aeronautical charts, radio navigational charts, aerial cameras and polaroid cameras. About half of them said they used weather maps, reports, and weather forecasts.

Approximately two-thirds of them said they did not need to know how to file a local flight plan. All observers but one said they had received no training in radiological survey equipment, or in conducting an aerial radiological survey.

DISCUSSION AND CONCLUSIONS

The results of this report strongly indicate that additional flight as well as tactical skills are required for pilots serving in Air Cavalry units. A pilot assigned directly from Basic Flight Training does not have the necessary skills required for complete job performance as an aeroscout pilot. The same comment applies to aeroscout observers. At the time this study was initiated the U.S. Army Armor School was developing an aeroscout observer training program. Prior to this study there was no formal training program for aeroscout observers. There was, also, no formal training program for aeroscout pilots. All pilots interviewed felt that a short course in Air Cavalry should be given to pilots prior to their assignment to an Air Cavalry unit.

Additional flying skills are required beyond those taught in Basic Flight Training for aeroscout pilots. Training in these skills could either be included or stressed more in the present flight program or given as an additional course of instruction to pilots being assigned to Air Cavalry units.

Pilots reported that they did not use maps, except in an emergency. This was due to the fact that they operated with another aircraft at a higher altitude who assumed the map reading duties for the scout aircraft and vectored them within the area they were reconnoitering. Another reason the pilots did not use maps was that they flew in the same areas day after day and became extremely familiar with the areas. In combat operations in the future, map reading skills may become much more important if all aircraft are required to operate at low altitude levels the majority of the time. Training in adjusting artillery and aerial fire support from low levels may be required in the future, as in Vietnam they were able to adjust from higher altitudes than might be available in future combat. The pilots reported that for operations in Vietnam the training they received in map reading, artillery, and aerial fire procedures and adjustment was adequate.

Both pilots and observers felt that training in target detection should be emphasized. If scouts are required to locate targets, then it should follow that they be taught what to look for. Evidently the training they received was not detailed enough or not accomplished at all. They did emphasize that training in Vietnam was good, but they felt pilots should have been taught a good working knowledge before assignment to Vietnam.

Communications training should encompass training in handling multiple radio transmissions and procedures for requesting fire support. Low level gunnery training, they felt, was not adequate. Five pilots indicated they received no training until assigned to Vietnam.

A First Aid course oriented toward aviation and emphasizing items found in the aircraft First Aid Kit should be developed.

In conducting reconnaissance, some sort of search plan should always be developed to ensure complete coverage of the search area. Techniques of searching do not differ greatly between zone and area reconnaissance. The type of search pattern used was dependent upon the geographical configurations and the enemy activity suspected or known. Airspeeds of 0-60 knots seem to be the preferred range for use in performing a zone reconnaissance. Airspeeds for conducting an area reconnaissance mission were usually slower than zone reconnaissance and flight patterns were randomized. The pilots felt that the radio magnetic indicator was the most useful instrument for reconnaissance reference purposes while in flight.

In conducting security missions, scouting techniques varied little, unless a change of area, situation, or enemy encountered changed. In the performance of advance guard airspeeds were higher. In operating with ground units, scouts usually operated 360° around them and usually flew slower and closer to them.

The standard terminology used to describe the different types of reconnaissance and security missions the pilots related to a conventional type of warfare and felt that Vietnam is an exception to conventional warfare.

Pilots felt that scouts should not engage in night operations as the present scout aircraft are not instrumented for night flying. A few of the pilots did perform night reconnaissance, primarily around camps and fire bases. If scouts are used at night it would be essential to have a co-pilot.

Training in the use of electronic detection equipment and in conducting chemical, radiological agent monitoring, and survey operations was extremely low as reported by the pilots. Future warfare may dictate more requirements for the above type of training than presently exist in Air Cavalry units.

In reporting information back to a higher headquarters pilots used a procedure called "spot report". The amount of information that the pilots were required to include in their spot reports was surprisingly detailed. Very few of the pilots and observers received any formal training in reporting information, yet this is one of their primary job duties. Pilots felt that even if their observers were trained to make spot reports, the pilot still should radio the information, not the observer. In many instances the information would be radioed to the higher flying aircraft which would sequence the information and do the actual radioing of the spot report to higher headquarters. Pilots also had no previous training in making bomb damage assessment reports. This type of mission is still essentially a reconnaissance mission. They felt that prior training would have been help-

ful in making such reports. All pilots reported that they received no prior training in briefing the Air Force Forward Air Controller; all pilots who did have to brief FAC as a scout received their training in Vietnam.

Pilots tend to feel that the observer's job is to observe, but not actually communicate spot report information, bomb damage information, or to communicate with the FAC. It would seem that some of the workload of the pilot could be relieved by having the observer handle some of the communications. Pilots felt if the observer did handle communications it would interfere with his main responsibility, which is observation, yet they felt that it does not interfere with the pilot's flying abilities in flying the aircraft at low levels.

In marking targets for tactical airstrikes the scouts found that the TAC hit targets better if the scouts marked the target rather than the FAC. Pilots disagreed among each other on the question of whether scouts should be trained to direct airstrikes without the aid of an FAC aircraft. Two-thirds of the pilots felt directing airstrikes was an essential scout duty and should be included in a formal training program. Pilots indicated no differences in directing TAC and helicopter gunships. They favored working with Army gunships as compared to working with TAC.

Pilots felt that performing medevac missions was a secondary part of a scout pilot's job and that pilots should perform such missions when terrain considerations or lack of regular medevac aircraft made it advisable. Pilots reported that they directed and assisted medevac aircraft. Aeroscouts usually provided air cover for medevac aircraft while they were on the ground. Two-thirds of the pilots reported that they received no training in directing medevac missions before assignment to a combat unit.

In marking of targets, most pilots preferred to mark with smoke grenades than any other means. When receiving heavy fire the pilots marked the target by going in very fast with as much suppressive fire as possible. If enemy fire was extremely heavy, the scout would get as near to the target as possible, drop a marker, then adjust fire support, using the marker as a reference.

Pilots felt that training in directing combat assaults should be included in a formal training program. Pilots reported that the knowledges and procedures for insertion of Ranger elements was much the same as that required for insertion of Air Mobile Forces.

Pilots were not agreed as to whether formal training in performing convoy cover missions should be conducted, or whether the skills could be learned on-the-job. They reported no appreciable differences in methods and techniques in conducting convoy cover, regardless of the composition of the convoy; e.g., combat vehicles, supply and combat

vehicles, all wheeled. Aeroscouts usually provided 360° support and also acted as the convoy control.

All pilots reported that they tried to avoid flight over open areas. Average flying speed over open terrain was 77 knots. They all reported that they flew as low as possible to the terrain to avoid fire. They reported flying at altitudes from several feet to 50 feet. In flying in hilly or mountainous terrain, high density altitude conditions presented flying problems. Pilots also mentioned wind conditions were usually bad, with up and down drafts. Reconnoitering in hilly or mountainous terrain also required more aircraft power. Flying under these conditions required greater technical skill on the part of the pilot.

Two-thirds of the pilots reported that their observer did not play an important role in keeping the pilot oriented during flight. Pilots were divided on the observer's proficiency in reporting grid coordinates and reported that the pilot usually made this type of report. Pilots felt that target locations should be reported within 50 meters.

Only three of the fifteen aeroscout observers interviewed had received job training as an observer prior to their job assignment. Two-thirds of the observers received no training in recognition and identification of enemy equipment, uniforms, etc., before being assigned as observers.

The main reason given by the observers for not detecting or recognizing targets when they first started to perform visual reconnaissance was that they did not know where to look or what to look for. "Flying too fast" and "too much to look at" were also given as reasons for not being able to detect or recognize targets when first performing visual search.

Observers recommended that more realistic target detection training be given depicting situations normally encountered in combat. Observers reported that stabilized image binoculars were a hindrance to detecting targets. Once a target had been detected the binoculars were a help in identifying the target.

A third of the observers interviewed had received training in aerial artillery adjustment before being assigned as observers. Some of the initial difficulties they encountered in adjusting artillery from the air were: (1) following radio procedures for requesting fire support; (2) adjusting fire at treetop height; (3) adjusting fire accurately; and (4) establishing the target location from a map. Observers felt that adjusting TAC fire support was easier than adjusting artillery fire support.

Approximately a third of the observers reported that they performed dismounted reconnaissance during aeroscout missions. They dismounted from the aircraft chiefly to retrieve enemy equipment, documents, and other items of an intelligence value.

Observers reported that accuracy in determining the aircraft's geographical location during flight was an important aspect of aerial navigation. Approximately half of the observers reported they did not always make a map study of the mission area as they flew over the same area daily and got to know the geographical area extremely well. A map scale of 1:50,000 was preferred by the observers with 1:25,000 being their second preference.

Observers reported they employed their individual weapons in two main situations: (1) against enemy ground fire, and (2) reconnaissance by fire. Quick-fire and firing from the hip were the two methods used by the observers in firing their weapons. Targets were engaged at airspeeds as slow as an average of 21 knots to as fast as an average of 55 knots. Normal target engagement distances were from 275 to 725 meters.

The most frequent type of radio communication performed by observers was the spot report.

Observers reported little or no use of navigational charts, aeronautical charts, radio navigational charts, etc.

The results of this survey report point out the need for formal training programs for both the aeroscout pilot and aeroscout observer. The additional skills and knowledges required for job performance in an Air Cavalry unit are extremely similar to ground cavalry operations and yet unique unto themselves, each complements the other. The mobility and speed of th helicopter places greater demands upon the men who operate them, they must be able to react quicker and be able to assimilate and evaluate tactical situations rapidly in a highly mobile environment.

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APPENDICES

APPENDIX A

AEROSCOUT PILOT SURVEY QUESTIONNAIRE

AEROSCOUT PILOT SURVEY QUESTIONNAIRE

1. Name/Rank:_____

2. Present Duty Assignment:_____

3. Present Unit:_____

4. Total Flying Experience In: Years _____ Months _____ Hours ____

5. Length of Service:_____

6. Did you receive training at the Armor School, Fort Knox, Kentucky, before attending Flight School? YES ___ NO ___. If YES, what course of instruction?_____

7. In what year did you take Basic Flight Training?_____

8. What course(s) did you take at aviation school, and in what year did you take them? Please specify the time period for each course of instruction.

9. Did you serve as a scout pilot in combat? YES ___ NO ___. If YES, how long? Years ___ Months ___ Hours ___

10. Did you serve in combat with an Air Cavalry squadron? YES ___ NO ___. If YES, what unit?_____ In what geographic area(s) did you fly?

11. Did you serve in combat with an Air Cavalry troop organic to an Armored Cavalry squadron? YES ___ NO ___. If YES, what unit? _____ ___ In what geographic area(s) did you fly?

12. Did you receive training at Flight School on Air Cavalry operations? YES ___ NO ___. If YES, did you feel that the training you received was adequate for assignment as a scout piloc to an Air Cavalry unit? YES ___ NO ___.

13. As a scout pilot in combat, what type(s) of aircraft did you fly? Please list type(s) and hours of combat flying experience with each type.

14. What course(s) of instruction did you take after Basic Flight Training before assignment to an Air Cavalry unit?

15. What additional job duties were you required to perform other than that of a scout pilot? (Example: maintenance officer, awards and decorations, R&R, etc.)

16. After assignment to an Air Cavalry unit did you receive team training in:

    a. Specific aircraft YES ___ NO ___
    Where_____

    b. Air Cavalry Teams YES ___ NO ___
    Where_____

    c. With overall unit effort YES ___ NO ___
    Where_____

17. What subjects, concerned with Air Cavalry operations, do you feel you were weak in and should be incorporated into a training program for aeroscout pilots before assignment to an Air Cavalry unit?

18. What areas of flight instruction should either be included or augmented, based on your flying requirements as a scout pilot? (Examples: Do you feel that scout pilots should have more training in low level autorotations? Do you feel that more training in running landings should be taught? Should scout pilots have more knowledge about crash-ability of the aircraft and the best ways of doing so? Should scout pilots receive more intensive training in density altitudes and the effect(s) of hovering out of ground effect or flying at slow speeds out of transitional lift?)

19. Was the map reading instruction you received during flight training adequate for performing the job of a scout pilot? YES ___ NO ___. If NO, what specific map reading skills and knowledges are required of a scout pilot?

20. Was the training received in Flight School on adjustment of artillery from an aerial platform adequate for performing the job of a scout pilot? YES ___ NO ___. If NO, what specific skills and knowledges should be taught to a scout pilot?

21. Was the training received in Flight School on adjustment of aerial fire support adequate for performing the job of a scout pilot? YES ___ NO ___. If NO, what specific skills and knowledges should be taught to a scout pilot?

22. Was the training received in Flight School on target detection adequate for performing the job of a scout pilot? YES ___ NO ___. If NO, what specific skills and knowledges should be taught to a scout pilot?

23. Did you receive training on recognition of enemy personnel and equipment during flight training? YES ___ NO ___.

24. Did you receive training on recognition of enemy personnel and equipment before assignment as a scout pilot? YES ___ NO ___. If YES, where?_____

25. If you answered YES to questions 23 or 24, do you feel that this training was adequate for performing the job of a scout pilot? YES ___ NO ___. If No, what specific skills and knowledges should be taught to scout pilots?

26. In your training in communications and radio-telephone procedures, were there skills and knowledges that should be emphasized or included in a scout pilot program of instruction?

27. Was the training you received on low level gunnery adequate for performing as a scout pilot? YES ___ NO ___. If NO, what specific skills and knowledges would be required for a scout pilot program?

28. Is it essential that a scout pilot know the organizational structure of the following:

			General Knowledge	Detailed Knowledge
a. Armored Brigade	YES ___	NO ___	___	___
b. Infantry Brigade	YES ___	NO ___	___	___
c. Mechanical Infantry Brigade	YES ___	NO ___	___	___
d. Armored Cavalry Brigade	YES ___	NO ___	___	___
e. Armored Cavalry Squadron	YES ___	NO ___	___	___
f. Air Cavalry Troop	YES ___	NO ___	___	___

29. Do you feel that the training you received on First Aid enabled you to adequately treat the combat injuries with which you had personal contact during combat? YES ___ NO ___. If NO, what types of injuries and their treatment should be included in a First Aid course for scout pilots?

30. Do you feel that the training received on survival was adequate? YES ___ NO ___. If NO, what specific skills and knowledges would be required in a scout pilot program?

Zone Reconnaissance

31. In performing a zone reconnaissance did you set up a search pattern before entering the zone? YES ___ NO ___. If YES, did it help you to cover the zone more thoroughly? YES ___ NO ___. If NO, did it take less time to cover the zone? YES ___ NO ___.

32. Did you locate, first, the visible boundaries of the zone before starting reconnaissance to aid you in performing a more complete coverage of the zone? YES ___ NO ___. If NO, what did you do?

33. What type(s) of flight pattern(s) did you use to cover the zone?

34. Did different types of terrain cause you to vary your search pattern? YES ___ NO ___, If YES, explain:

35. At what airspeeds did you normally perform a zone reconnaissance? _____knots.

36. How did different types of terrain affect your airspeed?

37. If a target was located did you call for immediate fire support before completing reconnaissance of the zone? YES ___ NO ___. If NO, what did you do?

38. What methods and techniques did you find best to use in accomplishing a zone reconnaissance?

Area Reconnaissance:

39. What methods and techniques did you find best to use in accomplishing an area reconnaissance?

40. Did your search pattern for an area reconnaissance differ from that of a zone reconnaissance? YES ___ NO ___. If YES, explain:

41. List any other considerations a scout pilot should be aware of when performing an area reconnaissance:

Route Reconnaissance:

42. Did you have to classify roads? YES ___ NO ___. If YES, what information did you have to report?

43. Did you report potential ambush sites? YES ___ NO ___.

44. Did you report closeness of tree lines to the road? YES ___ NO ___.

45. What methods and techniques did you use in performing a route reconnaissance?

River Reconnaissance:

46. Did you have to perform a river reconnaissance, either to locate crossing sites or for use as a route of movement? YES ___ NO ___. If YES, did you report:

a. ___Width of river
b. ___Depth
c. ___Type of bottom
d. ___Speed of current
e. ___Enemy landing points
f. ___Slope of bank
g. ___Trails leading to river
h. ___Bridges
i. ___Obstacles
j. ___Location of rapids
k. ___Trafficability

List other items of consideration:

47. What methods and techniques did you use in performing a river reconnaissance?

48. How did you determine the type of river bottom?

49. How did you determine the speed of the current?

50. How did you determine the degree of slope of the banks?

General

51. Was there any difference in your job in performing a zone reconnaissance as versus an area reconnaissance mission? YES ___ NO ___. If YES, explain the difference in techniques.

52. In performing a route reconnaissance, what differences did this type of mission assignment have on your job as versus assignment of a zone reconnaissance or area reconnaissance mission? Explain difference in techniques.

53. In performing ADVANCE, FLANK, and REAR GUARD missions, what differences did mission assignment make in your job? Explain difference in techniques.

54. In performing a screening mission, did your job performance differ from ADVANCE, FLANK, and REAR GUARD mission assignment? YES ___ NO ___. If YES, explain difference in techniques.

55. Is it essential that a scout pilot know the various types of reconnaissance and security missions performed by the Air Cavalry troop organic to the Armored Cavalry squadron? YES ___ NO ___.

56. Is it essential that a scout pilot know how an Armored Cavalry squadron conducts reconnaissance and security missions? YES ___ NO ___.

57. Did you as a scout pilot use electronic sensing equipment in performing surveillance? YES ___ NO ___.

58. Did you as a scout pilot use night vision equipment in performing surveillance? YES ___ NO ___.

59. Is it essential that a scout pilot know how the Armored Cavalry squadron conducts an attack? YES ___ NO ___.

60. Is it essential that a scout pilot know the role of the Air Cavalry troop in an offensive action? YES ___ NO ___.

61. Is it essential that a scout pilot know how the Armored Cavalry squadron conducts defensive operations? YES ___ NO ___.

62. Is it essential that a scout pilot know the role of the Air Cavalry troop in conducting Air Mobile Reconnaissance operations? YES ___ NO ___.

63. Did you receive training on how to conduct chemical agent and radiological monitoring and survey operations? YES ___ NO ___. If YES, where?_____

64. What type(s) of night operation missions were you required to perform?

65. What specific skills are required for night operations that are not required during daylight?

66. List the methods and techniques you found useful in conducting night operation missions:

SPOT REPORTS

67. How often did you give spot reports during a normal mission?

a. ___Many times
b. ___Few times
c. ___Very seldom

68. How did you learn your unit's method of giving spot reports?

a. ___What was taught in the manual
b. ___Unit classroom instruction
c. ___Formal school training program
d. ___Talking to other pilots
e. ___Listening to spot reports being given
f. ___Gave them the way you thought best
g. ___Other (Explain)

69. Do you think formal school training should be given on how to give spot reports? YES ___ NO ___.

70. Was your observer trained to give spot reports? YES ___ NO ___.

71. Did your observer usually make the spot reports for you? YES __ NO ___.

72. Where did your observer learn to give spot reports?

_____

73. Would it have made your job easier if your observer had been trained to give spot reports before serving with an active unit? YES ___ NO ___.

74. Did your giving of spot reports as a pilot interfere with your flying requirements? YES ___ NO ___. If YES, why did you not let the observer make the report? Explain:

75. Should the following information be given in a spot report for a trail?

a. ___Time
b. ___Grid
c. ___Direction of movement
d. ___Direction of trail
e. ___Number of personnel using trail and how recently
f. ___Width of trail
g. ___How often trail is being used
h. ___Bridges along trail
i. ___Graves

List any other items you feel are necessary:

76. In what format would you list the information on the preceding question to include those items you added? Exclude those items you think are not necessary.

77. Did you use the following methods for determining items in spot reports for trails?

a. Time

1. ___Use of aircraft clock
2. ___Use of personal watch
3. ___Other (Explain)

b. Direction of movement

1. ___Number of footprints, heel markings, etc.
2. ___Broken grass or limbs
3. ___Wheel markings
4. ___Drag marks on trail
5. ___Other (Explain)

c. Direction of trail

1. ___Use of RMI
2. ___Use of magnetic compass
3. ___Other (Explain)

d. Number of personnel using trail

1. ___Number of footprints
2. ___Width of trail
3. ___How hard packed
4. ___Brush broken down along trail
5. ___Clearness of impressions in mud or sand
6. ___Muddy water on trail
7. ___Water marks above or below breaks in grass
8. ___Trampled green foliage on trail
9. ___Dew on grass
10. ___Mud splashed on objects around trail
11. ___Dead leaves turned over to expose wet undersides
12. ___Other (Explain)

e. Width of trail

1. ___Comparison of size of trail to objects around it
2. ___Type of equipment or personnel using trail
3. ___Other (Explain)

f. How often trail is being used

1. ___Old and new footprints
2. ___Night camp locations along trail
3. ___Objects that have been cleared from trail
4. ___Condition of foliage around trail
5. ___Other (Explain)

g. Bridges along trail

1. ___Did you give length
2. ___Did you give width
3. ___Did you give capacity
4. ___Did you give building material
5. ___Other (Explain)

h. Grave reports

1. ___Did you give number
2. ___Did you give age
3. ___Did you report type of individual buried
4. ___Other (Explain)

78. Should the following information be given for bunkers and fighting positions?

a. ___Time
b. ___Grid
c. ___Number of bunkers and fighting positions
d. ___Size
e. ___Type and kind
f. ___Type of building materials
g. ___Report if position was located under structures
h. ___Area complex covers and way positioned
i. ___Recent use
j. ___Supplies in area
k. ___Trails leading to and from area
l. ___When bunkers and fighting positions were built

List any other items you think should be included:

79. In what format would you list the above information to include those items you added? Exclude those items you think are not necessary.

80. Did you use the following methods for determining items in spot reports for bunkers and fighting positions?

a. Number of bunkers and fighting positions

1. ___Actual count
2. ___Estimated number

b. Size of bunkers and fighting positions

1. ___Estimated length
2. ___Estimated width
3. ___Other (Explain)

c. Type and composition

1. ___Report overhead cover
2. ___Report if permanent type
3. ___Report if walls were supported
4. ___Report type of building materials used
5. ___Report camouflage
6. ___Other (Explain)

d. Area bunkers and fighting positions covered and how set up

1. ___Gave length of area
2. ___Gave width of area
3. ___Gave position of bunkers and fighting positions in area
4. ___Other (Explain)

e. Recent use of bunkers and fighting positions

1. ___Footprints in area
2. ___Campfire locations in area
3. ___Entrances to structures (signs of usage)
4. ___Activity on trails leading to and from area
5. ___Smell of incense, food, etc.
6. ___Recent repairs
7. ___Other (Explain)

f. Supplies in area

1. ___Report weapons in area
2. ___Report ammunition in area
3. ___Report food in area
4. ___Report clothing in area
5. ___Report cooking utensils, tools, etc.
6. ___Other (Explain)

g. Trails leading to and from area

1. ___Number of trails
2. ___Direction of trails
3. ___Condition of trails
4. ___Age of trails
5. ___Camouflage used on trails
6. ___Other (Explain)

81. List any other information you think should be included for determining the information you would include in a spot report for bunkers and fighting positions:

82. Should the following information be given for structures in a spot report?

a. ___Time
b. ___Grid
c. ___Number of structures
d. ___Size of structures
e. ___Type of structures
f. ___If bunkers located under structures
g. ___Type of building materials used
h. ___Area structures cover
i. ___Recent use
j. ___Supplies in area
k. ___Trails leading to and from area
l. ___When structures were built

83. List any other items you think should be included in a spot report for structures:

84. In what format would you list the above information to include those items you added? Exclude those items you think are not necessary.

85. Did you use the following methods for determining items in spot reports for structures?

a. Number of structures

1. ___Actual count
2. ___Estimated number
3. ___Other (Explain)

b. Size of structures

1. ___Estimated length
2. ___Estimated width
3. ___Estimated height

c. Types of structures

1. ___Reported if permanent or temporary types
2. ___What they were used for
3. ___Condition of structures
4. ___State of repair
5. ___Other (Explair

d. Area structures cover and way positioned

1. ___Length of area
2. ___Width of area
3. ___Way positioned (circle, square, etc.)
4. ___Other (Explain)

e. Recent use

1. ___Number of footprints
2. ___Campfire locations
3. ___Activity on trails leading to and from area
4. ___Smell of food, incense, etc.
5. ___Recent repairs
6. ___Camouflage used
7. ___Other (Explain)

f. Supplies in area

1. ___Reported weapons in area
2. ___Reported ammunition in area
3. ___Reported food in area
4. ___Reported clothing in area
5. ___Reported cooking utensils, tools, etc.
6. ___Other (Explain)

g. Trails leading to and from area

1. ___Number of trails
2. ___Direction of trails
3. ___Age of trails
4. ___Usage of trails
5. ___Other (Explain)

86. List any other items you think should be included for determining the information you would include in a spot report for structures.

87. Should the following information be given in a spot report for anti-aircraft weapons?

a. ___Time
b. ___Grid
c. ___Number of anti-aircraft weapons
d. ___Number of enemy firing and supporting weapons
e. ___Tactical positions in which the guns are set up
f. ___Area in which weapons are displaced
g. ___Amount of fire being taken

88. List any other items you think should be included in a spot report for anti-aircraft weapons.

89. In what format would you list the above information to include those you added? Exclude those items you think are not necessary.

90. Did you use the following methods for determining items in spot reports for anti-aircraft weapons?

a. Number of anti-aircraft weapons

1. ___Actual count
2. ___Estimated count
3. ___Other (Explain)

b. Number of enemy firing and supporting weapons

1. ___Actual count
2. ___Personnel required to fire weapons
3. ___Amount of fire being received
4. ___Other (Explain)

c. Tactical position of guns

1. ___Reported three-way trap
2. ___Reported wood line trap
3. ___Reported ravine or valley trap
4. ___Other (Explain)

d. Area weapons cover

1. ___Altitude covered by altimeter reading
2. ___Width of area
3. ___Length of area
4. ___Other (Explain)

e. Amount of fire being received

1. ___What interval fire was being received
2. ___Amount of fire being received at each interval
3. ___Amount of fire being received by type of weapon firing

91. List any other items you think should be included for determining the information you would include in a spot report for anti-aircraft weapons.

BOMB DAMAGE ASSESSMENT (BDA) REPORT

92. Did you as a scout pilot have to make BDA's? YES ___ NO ___.

93. Is making BDA's an essential task in performing the job of a scout pilot? YES ___ NO ___. If NO, explain:

94. Do you think the observer should be trained to make BDA's? YES ___ NO ___. If YES, where should he receive his training?

_____

95. Did your observer make BDA's? YES ___ NO ___. If NO, explain:

96. Did you have previous training in making BDA's? YES ___ NO ___. If YES, where did you receive this training?

_____

97. Did making BDA's as a scout pilot interfere with your mission, when your specific mission was not a BDA mission? YES ___ NO ___.

98. Would it have made your job as a scout pilot easier if your observer had reported BDA information? YES ___ NO ___.

99. Should the following information be given for a BDA report?

a. ___YES ___NO Numerical count of items destroyed
b. ___YES ___NO Items destroyed
c. ___YES ___NO Size of items destroyed
d. ___YES ___NO Whether bombs and artillery were surface, sub-surface, air burst
e. ___YES ___NO Number of enemy killed
f. ___YES ___NO Percent of area coverage by airstrike

100. List any additional items that are required in making a BDA.

101. Is there any difference in the amount of information given in a BDA when the mission is strictly BDA or when the BDA is given in conjunction with another type of mission? YES ___ NO ___. If YES, explain what difference.

102. For the number of enemy killed, did you have to give the actual body count or only an estimate?

a. ___Body count
b. ___Estimate

103. If you estimated the number killed, what factors did you use to make your estimation?

104. What methods and techniques did you use in surveying the target area after the target had been engaged?

BRIEFING OF FORWARD AIR CONTROL (FAC) AIRCRAFT

105. Did you as a scout pilot have to brief FAC aircraft? YES ___ NO ___.

106. Where did you receive training on how to brief FAC aircraft?

_____

107. If you had no formal schooling on how to brief FAC aircraft, do you think this should be taught as a part of a formal school program? YES ___ NO ___.

108. Would it have made your job easier if you had previously received this type of training? YES ___ NO ___.

109. How did you derive your procedure for briefing FAC aircraft?

110. How often did you have to brief FAC aircraft?

a. ___Frequently
b. ___Every so often
c. ___Rarely

111. Is briefing FAC aircraft an essential task in performing the job of a scout pilot? YES ___ NO ___.

112. Do you feel that someone else (not crew members) could have briefed the FAC aircraft and left you to do your job? YES ___ NO ___. If YES, who should perform this task?

_____

113. Do you feel that your observer should be trained to brief FAC aircraft? YES ___ NO ___. If NO, explain:

114. Did your observer brief FAC aircraft? YES ___ NO ___. If YES, where did he receive his training?_____
If NO, would it have made your job easier if he could have been able to brief FAC? YES ___ NO ___.

115. Did your giving briefings to FAC interfere with your mission? YES ___ NO ___. If YES, explain why you did not let the observer brief FAC.

116. Do you think the following information should be given in briefing FAC aircraft?

a.	___YES	___NO	Number of targets
b.	___YES	___NO	Target description
c.	___YES	___NO	Area to be covered
d.	___YES	___NO	Fire that might be expected
e.	___YES	___NO	Recommend type of armament to engage target
f.	___YES	___NO	Altitude of target
g.	___YES	___NO	Altitude of obstructions in area
h.	___YES	___NO	Methods of delivery
i.	___YES	___NO	Type of fire control adjustment by scout
j.	___YES	___NO	Ceiling
k.	___YES	___NO	Wind direction and speed

117. List any other items that need to be included, other than those mentioned above.

118. In what order (sequence) do you think the above items, along with your additions, if any, should be presented?

119. Did you give or use the following methods for determining items for briefing FAC aircraft?

a. Number of targets

1. ___Actual count
2. ___Estimated count

b. Target description

1. ___Report enemy troops
2. ___Report bunkers and fighting positions
3. ___Report structures
4. ___Report anti-aircraft weapons
5. ___Report caches

c. Area to be covered

1. ___Give length in meters
2. ___Give width in meters

d. Fire that might be expected

1. ___Report number of weapons
2. ___Report location of weapons
3. ___Report type of weapons

e. Recommend type of armament

1. ___Recommend point detonating
2. ___Recommend delayed fuse
3. ___Recommend variable time (VT) fuse
4. ___Recommend napalm
5. ___Recommend cluster bomb unit (CBU)

120. What other considerations did you use in determining the type of bombs recommended?

121. List the different types of targets and terrain features for which you think specific types of bombs should be used.

a. Point detonating bomb

b. Delayed fuse bomb

c. VT

d. Napalm

e. CBU

f. Any other

DIRECTING AIRSTRIKES

122. Did you as a scout pilot have to direct airstrikes? YES ___ NO ___.

123. Where did you receive training on how to direct airstrikes?

a. ___Classes in organization unit
b. ___Unit SOP
c. ___Talking to other pilots
d. ___Instruction by Air Force personnel
e. ___School training. If so, what school and what course of instruction?
f. ___Other (Explain)

124. If you had no formal training on how to direct airstrikes, do you think this should be taught as part of a formal school program? YES ___ NO ___.

125. Would it have made your job easier if you had received this type of training? YES ___ NO ___.

126. How did you derive your procedure for directing airstrikes?

127. Do you think the observer should be trained to direct airstrikes? YES ___ NO ___. If YES, where should he receive this training?

_____

128. Did you let your observer direct airstrikes? YES ___ NO ___.
If NO, explain why you did not let him do so.

129. Would it have made your job easier if your observer had been trained to direct airstrikes? YES ___ NO ___. If NO, explain:

130. Do you think the FAC aircraft could have directed airstrikes without your support? YES ___ NO ___. If NO, explain:

131. Did you direct airstrikes without the assistance of a FAC aircraft? YES ___ NO ___.

132. Is directing airstrikes an essential task in performing the job of a scout pilot? YES ___ NO ___. If NO, explain:

133. Should scout pilots be trained to direct airstrikes without the aid of FAC aircraft? YES ___ NO ___.

134. What methods or techniques did you use in directing airstrikes?

135. List any additional items that you think are necessary for directing airstrikes.

DIRECTING ATTACK HELICOPTERS

136. Did you as a scout pilot have to direct attack helicopters? YES ___ NO ___.

137. Are there any basic differences in directing attack helicopters from that of directing tactical air airstrikes? YES ___ NO ___.
If YES, explain and list the differences.

138. What methods or techniques did you use in directing attack helicopters?

139. List any additional items that are necessary for directing attack helicopters:

MEDICAL EVACUATION (MEDEVAC)

140. Is performing medevac part of the job of a scout pilot: YES ___ NO ___.

141. If YES to above, did performing medevac interfere with the accomplishment of your reconnaissance mission: YES ___ NO ___.

142. Do you feel that a scout pilot should have to perform medevac:
YES ___ NO ___.

143. Did you always know the location for evacuation of medical evacuees:
YES ___ NO ___ SOMETIMES___.

144. Did you contact medical personnel before arrival and advise them as to the situation and your ETA? YES ___ NO ___.

145. What is the observer's job duties while performing a medical evacuation mission?

146. List anything else that might be useful in performing a medevac mission:

DIRECTING MEDEVAC MISSIONS

147. Did you have to direct medevac aircraft? YES ___ NO ___.

148. What considerations did you take into account in selecting an appropriate landing zone (LZ)? Please list them:

149. Did you brief medevac aircraft on the location of the enemy, weapons, and fire to be expected? YES ___ NO ___.

150. Did you request medevac support? YES ___ NO ___.

151. Did you brief medevac aircraft on what was needed to extract the wounded? YES ___ NO ___.

152. Did you inform medevac aircraft as to the extent of the seriousness of the wounds? YES ___ NO ___.

153. Did you advise as to the best approach heading? YES ___ NO ___.

154. Did you brief medevac as to barriers and obstacles in the LZ? YES ___ NO ___.

155. Did you provide air cover for medevac? YES ___ NO ___.

156. Did you make sure medevac had radio contact with ground elements? YES ___ NO ___.

157. Do you feel that directing medevac operations aided the medevac pilot? YES ___ NO ___. Explain:

158. List any other considerations a scout pilot should know in directing medevac operations:

159. Did you receive training in directing medevac missions. YES ___
NO ___. If YES, explain:

160. Do you feel that this type of training should be taught in a formal training program for scout pilots? YES ___ NO ___

161. Was your observer trained to direct medevac aircraft? YES ___ NO ___.
If YES, where did he receive his training?

_____ _____

162. Should the observer be trained to direct medevac aircraft? YES ___
NO ___. If NO, explain:

RECONNAISSANCE BY FIRE

163. Where did you use reconnaissance by fire?

164. What weapons did you employ in reconnoitering by fire?

a. ___Aircraft Weapons Sub-System XM-27E1
b. ___M16 or CAR 15 Individual Weapons
c. ___M-60 Machine Gun
d. ___Grenades
e. ___Other

165. What methods or techniques did you use in employing reconnaissance by fire?

166. List any other considerations when employing reconnaissance by fire:

MARKING OF TARGETS

167. Did you try to avoid flying over target center or mass when marking targets? YES ___ NO ___.

168. What methods or techniques did you use in avoiding ground fire when marking targets?

169. Did you mark targets from which you were receiving heavy fire? YES ___ NO ___. If NO, what action did you take?

170. Did you mark a target by placing fire on it from a distance with the:

a. ___Aircraft Weapons Sub-System XM-27E1
b. ___M-60 Machine Gun
c. ___M16 or CAR 15 Individual Weapons
d. ___Other

ACTION ON RECEIVING ENEMY FIRE

171. Were you caught in a three-way trap? YES ___ NO___. If YES, did you find it best to break directly over one gun rather than to fly between them? YES ___ NO ___. If NO, explain what procedure you used to best advantage in escaping from such a situation.

172. Were you tracked by radar controlled anti-aircraft weapons? YES ___ NO ___. If YES, explain what procedure you used in breaking contact with such a weapons system.

173. What methods or techniques did you employ after receiving enemy fire?

174. List any other considerations you think are important concerning action on receiving enemy fire:

175. After receiving fire, what were your subsequent actions? (Example: fly out of firing range and call for fire support, mark target, report gun position, etc.)

176. What actions did your observer perform upon receiving enemy fire.

177. What procedures did you use when hits were taken and the extent of damage to the aircraft was not known?

178. Did you have to use an aviation gas mask YES ___ NO ___. If YES, in what situation did you use it?

179. Did you receive training in using an aviation gas mask while performing your normal flying duties? YES ___ NO ___. If NO, do you think you should have received this type of training? YES ___ NO ___.

AIR MOBILE ASSAULTS WITH INFANTRY

180. Did you have to direct combat assaults? YES ___ NO ___.

181. Did you determine the LZ to be used? YES ___ NO ___. If YES, what factors did you consider in determining an appropriate LZ?

182. Did you request artillery preparations for the LZ? YES ___ NO ___.

183. Did you inform Combat Assault Group of barriers and obstacles in the LZ? YES ___ NO ___.

184. Did you inform them as to the number of aircraft that could go into the LZ at a time? YES ___ NO ___.

185. Did you inform them as to the landing azimuth for their approach? YES ___ NO ___.

186. Did you establish radio contact with ground forces after their insertion? YES ___ NO ___.

187. List any other considerations that a scout pilot should know when directing air mobile infantry insertions:

188. Did you receive formal training on how to direct air mobile infantry insertions? YES ___ NO ___. If YES, where?_____
If NO, do you think that it should be taught? YES ___ NO ___.

189. How did you receive your training on directing air mobile infantry insertions?

INSERTION OF RANGER ELEMENTS

190. Did you have to direct insertions? YES ___ NO ___.

191. Did you know the location of the primary LZ before taking off on a mission? YES ___ NO ___.

192. Did you report barriers and obstacles in the LZ? YES ___ NO ___.

193. Did you brief the insertion team on enemy activity before insertion? YES ___ NO ___. If YES, do you feel that this aided the team in the accomplishment of their mission? YES ___ NO ___.

194. Did you advise as to the best landing azimuth? YES ___ NO ___.

195. Did you establish radio contact with the insertion team after insertion? YES ___ NO ___.

196. Did you know the location of the secondary LZ, if needed? YES ___ NO ___.

197. Did you avoid dropping smoke in the LZ to prevent sighting by the enemy? YES ___ NO ___.

198. List any other considerations a scout pilot should know when working with insertion teams:

199. Did you receive training on how to direct and work with insertion teams? YES ___ NO ___. If YES, where?_____

200. Do you feel that training on how to direct and work with insertion teams should be given in a formal training program for scout pilots? YES ___ NO ___. If NO, explain:

CONVOY COVER

201. Did you perform convoy cover? YES ___ NO ___.

202. Did you help in maintaining convoy control by advising ground commander of vehicle dispositions during movement? YES ___ NO ___. If YES, explain what you did:

203. Did you keep radio contact with the convoy? YES ___ NO ___.

204. Did you reconnoiter both for ahead and close into convoy? YES ___ NO ___.

205. Did you inform the convoy as to possible ambush sites? YES ___ NO ___.

206. Did you inform the convoy as to the location of bunkers, spider holes, etc., along the route of movement? YES ___ NO ___.

207. Did you try to find mines placed along the route? YES ___ NO ___.

208. Did you inform the convoy as to obstacles and barriers ahead of them? YES ___ NO ___.

209. Did you inform the convoy as to the location of:

a. YES ___ NO ___ Bridges
b. YES ___ NO ___ River crossing sites
c. YES ___ NO ___ Prominent terrain features dominating the route

210. Did you request and direct fire support for the convoy? YES ___ NO ___.

211. What methods or techniques did you use in performing convoy cover?

212. List any other considerations that you feel are essential to performing convoy cover:

213. Did you receive formal training on how to perform convoy cover?
YES ___ NO ___. If YES, where?_____

214. Did you perform convoy cover in a practical field training situation?
YES ___ NO ___.

215. Do you feel that training on how to perform convoy cover should be taught in a training program, or can this be learned OJT?

a. ___Training
b. ___OJT

216. What actions did you take after the enemy had initiated an ambush?

217. What does the observer do during performance of a convoy cover mission?

218. Do the methods and techniques of performing convoy cover differ if the convoy composition consists of only wheeled transportation/resupply vehicles, combat elements, plus transportation/resupply, combat vehicles only? YES ___ NO ___. If YES, explain the differences:

FRIENDLY ELEMENTS IN CONTACT

219. When working with friendly elements in contact, did you identify their positions from altitude before working low level? YES ___ NO ___.

220. Did you obtain visual contact with each element after going low level? YES ___ NO ___.

221. Did you identify each element by call sign?. YES ___ NO ___.

222. Did you determine how fast and in what direction each element was moving? YES ___ NO ___.

223. Did you ask for known enemy locations in the area? YES ___ NO ___.

224. Did you ask for the type of weapons the enemy was using? YES ___ NO ___.

225. Did you look for ambushes the enemy may have set? YES ___ NO ___.

226. Did you determine possible enemy escape routes? YES ___ NO ___.

227. Did you mark targets for ground troop support? YES ___ NO ___.

228. Did you direct fire support for ground troops? YES ___ NO ___.

229. Did you advise the ground commander for maneuvering of ground troops? YES ___ NO ___.

230. Did you give close-in support to ground troops? YES ___ NO ___.

231. Did you keep the ground troops informed as to your location in relation to their location while working in-close to them? YES ___ NO ___.

232. Did you use your aircraft position to act as a reference for ground troops to adjust their fire on enemy positions? YES ___ NO ___.

233. Realizing that sound is a distractor to ground troops and detracts from possible detection of the enemy, did you try to keep close-in support to a minimum? YES ___ NO ___.

234. Did you keep in radio contact with all elements at all times? YES ___ NO ___. If NO, explain:

235. List any additional factors you found helpful in working in support of ground troops:

236. Did you request and direct medevac operations for ground troops? YES ___ NO ___.

237. Did you perform BDA's for ground troops for fire support of their operations? YES ___ NO ___.

238. Did you give possible night camp locations for ground troops? YES ___ NO ___.

239. Did you give the position of the LZ for resupply aircraft when requested? YES ___ NO ___.

240. Did you inform ground troops of work needed to be done to prepare the LZ? YES ___ NO ___.

241. Were you given field training (not to include OJT) on how to work with ground troops? YES ___ NO ___.

242. Did you receive classroom instruction on how to work with ground troops? YES ___ NO ___.

LINKING UP FRIENDLY ELEMENTS

243. Is linking up friendly elements part of the job of a scout pilot? YES ___ NO ___.

244. Did you link up friendly elements? YES ___ NO ___.

245. Did you maintain contact with both elements during link up? YES ___ NO ___.

246. Did you make sure both elements had radio contact with each other? YES ___ NO ___.

247. Did you keep both elements advised as to the distance they were apart from each other? YES ___ NO ___.

248. List the methods or techniques you used in linking up friendly elements:

249. Were you given formal school instruction on how to link up friendly elements? YES ___ NO ___. If YES, where?_____

250. Would it have made your job easier if you had received training on how to link up friendly elements? YES ___ NO ___.

251. Was your observer trained to link up friendly elements? YES ___ NO ___. If NO, would it have made your job easier if he had been trained? YES ___ NO ___.

252. How did your observer receive his training on methods and techniques for linking up operations?

LOW LEVEL FLYING AND NAVIGATION

Open Areas

254. Did you try to remain clear of open areas when possible? YES ___ NO ___.

255. What airspeeds did you maintain when flying over open areas? _____knots.

256. Did you fly as close to the terrain as possible? YES ___ NO ___. If NO, explain:

257. Did you fly above the terrain at a higher distance to make for easier flying? YES ___ NO ___.

258. Do you think your chances of avoiding taking hits were better when flying extremely close to the terrain or at a distance above the terrain?

a. ___Close
b. ___Above

259. At what altitudes did you normally fly when performing a low level flight mission across open terrain?_____

260. What methods or techniques did you use in reconnoitering open terrain?

261. Do you think your chances of taking hits were greater in open areas? YES ___ NO ___.

Mountainous or Hilly Terrain

262. What precautions did you take when reconnoitering mountainous or hilly terrain?

263. Do you believe that flying in mountainous or hilly terrain is more dangerous than flying over flat, heavily foliated terrain?
YES ___ NO ___. If YES, explain:

Ridge Lines, Tree Lines, Waterways

264. What methods or techniques did you use in reconnoitering ridge lines?

265. What methods or techniques did you use in reconnoitering tree lines?

266. What methods or techniques did you use in reconnoitering waterways?

267. How did you estimate the depth of waterways?

268. How did you estimate the speed of waterway currents?

269. How did you estimate the slope of entrances and exits into waterways which would support movement of swimable vehicles?

270. What methods or techniques did you use in reconnoitering heavily wooded areas?

271. What methods or techniques did you use in reconnoitering valleys and hilly terrain?

Hovering During Reconnaissance

272. Do you believe that hovering is an absolute requirement for performance of reconnaissance during a mission? YES ___ NO ___.

273. List the hazards when hovering at low airspeeds during a reconnaissance mission:

274. Specify the methods or techniques you used to avoid enemy fire on initial contact during a reconnaissance mission:

Geographical Orientation

275. What methods or techniques did you use to maintain your geographic orientation during low level flight missions?

276. Did your observer play an important role in keeping you oriented during low level flight? YES ___ NO ___. If YES, what did he do to help you?

277. What are the most important skills needed to maintain your geographic orientation?

278. Did you or your observer give the grid coordinates for target location?

a. ___Piloc
b. ___Observer

279. How accurate in meters must you be in determining target locations by grid coordinates? _____

280. Were your observers proficient in giving grid coordinates?
YES ___ NO ___.

281. Were your observers proficient in geographic orientation?
YES ___ NO ___.

282. Were your observers proficient in basic map reading skills?
YES ___ NO ___.

283. What percentage of the targets detected did you detect without aid from your observer? _____%

284. What percentage of the targets located did you have to give the grid coordinates without aid from your observer? _____%

285. What did the observer do to help you in the performance of low level navigation?

286. Could you have done as well without the aid of your observer in low level navigation? YES ___ NO ___. If YES, explain:

287. List any other considerations in low level flying that have not been included or mentioned:

EMERGENCY FLIGHT INDICATORS

288. In a situation(s) where you knew you could not return to your base of operations due to aircraft damage or malfunction, what factors and indicators did you use in arriving at a decision as to bringing down the aircraft?

289. In a situation(s) where you sustained damage or had aircraft malfunction, what factors and indicators did you use in making your decision to try to make it back to your base of operations?

290. Did you participate in refueling operations, using the aircraft refueling kit? YES ___ NO ___. If YES, what specific information does the scout pilot need to know about refueling operations with the individual aircraft and with refueling operations in the field during tactical flight movements?

291. Did you engage in combat operations with allied forces? YES ___ NO ___. If YES, what specific information does the scout pilot need to know when working with allied forces?

292. What type of training should the scout pilot receive in order to identify malfunctions or to make "on the spot" corrections of the weapons sub-system? SPECIFY PARTICULAR SUB-SYSTEM(s):

293. How high a level of organization of Tactical Infantry and Armor units does a scout pilot need to know for directing these units?

294. What kinds of information does the scout pilot need to know about Tactical Infantry and Armor units in order to direct them?

APPENDIX B

AEROSCOUT OBSERVER SURVEY QUESTIONNAIRE

AEROSCOUT OBSERVER SURVEY QUESTIONNAIRE

1. Name/Rank:_____

2. Present Duty Assignment:_____

3. Present Unit:_____

4. Time in Service:_____

5. How long did you serve as an aeroscout observer?_____

6. Did you serve in combat as an aeroscout observer? YES ___ NO ___.
If YES, how long?_____

7. What unit(s) did you serve with as an aeroscout observer in combat?
_____

8. What unit(s) did you serve with as an aeroscout observer under non-combat conditions?_____
If none, please state so._____

9. How did you become an aeroscout observer?

10. What MOS and what job assignment were you in before becoming an aeroscout observer?_____

11. Did you receive training for the aeroscout observer job before performing in the job assignment (include unit schools)? YES ___ NO ___.
If YES, where did you receive your training and who conducted it?
_____

12. In what type(s) of aircraft did you fly as an aeroscout observer?
_____

13. In what particular geographic area(s) did you perform the job of an aeroscout observer? If Vietnam, specify the particular area(s) in which you served:

14. If you volunteered for the job of aeroscout observer, what was the reason?

15. How long had you been in service when you were assigned the job of aeroscout observer?_____

16. Do you feel that it is absolutely essential that the aeroscout observer have minimum flight skills so that he can take over the controls of the aircraft in an emergency? YES ___ NO ___.

17. Did you as an aeroscout observer have to take over control of the aircraft due to pilot injury? YES ___ NO ___. If YES, how many times? _____

18. Do you now possess the ability to fly a scout helicopter? YES ___ NO ___. If YES, what types?_____

19. Where did you learn to fly helicopters?_____
_____

VISUAL DETECTION SKILLS

20. The current scanning technique being taught by the U.S. Army for observation from low flying aircraft is called the Side Scan Method. Did you use this method in searching for targets in your performance as an aeroscout observer? YES ___ NO ___. If NO, what scanning technique did you use?

---

21. In general, what factors contributed most to detection of targets? (Example: particular shape, recognition of objects, contrast with background, movement, etc.)

22. Many aerial observers reported that they suffered from air or motion sickness while observing at low levels. What did you do to nullify this effect?

23. What factors contribute to air or motion sickness while observing at low level altitudes?

24. Did you receive training on recognition and identification of enemy equipment, uniforms, etc., before serving as an aeroscout observer? YES ___ NO ___. If YES, where did you receive this training?

If NO, did it make your job more difficult? YES ___ NO ___.

25. What type(s) of targets were easiest to detect?

26. What type(s) of targets were the most difficult to detect?

27. Were most of the targets detected the first time you flew over the area? YES ___ NO ___.

28. What factors caused you to detect a target when it was camouflaged?

29. Pilots and observers have said that when they "first started to fly reconnaissance missions, they could not see targets that the experienced personnel could detect." What was the main reason you could not either detect or recognize the target?

a. ___Saw the target shape, but could not identify the object.
b. ___Did not see the target at all.
c. ___Too much to look at all at once.
d. ___Flying too high.
e. ___Flying too fast when first performing the job.
f. ___Did not know where to look for targets.
g. ___Did not know what to look for.
h. ___Needed to get accustomed to flying at low levels.
i. ___Did not have any problem.
j. ___Other (Explain)

30. What type of training would you recommend for aiding in teaching target detection for aeroscout observers?

31. Some observers have said they "used binoculars which stabilized the image." If you used them, did they help in the detection of targets? YES ___ NO ___. If NO, explain:

ARTILLERY, NAVAL GUN, TACTICAL AIR COMMAND (TAC) FIRE ADJUSTMENT

32. Did you receive training on adjustment of artillery from the air before performing as an aeroscout observer? YES ___ NO ___. If YES, where did you receive your training?_____

33. Did you adjust artillery fire as a normal part of your job as an aeroscout observer? YES ___ NO ___. If NO, explain why the pilot adjusted it rather than you:

34. What did you find was the most difficult task in adjusting artillery from the air?

35. Did you receive training on adjustment of naval gun fire? YES ___ NO ___. If YES, where did you receive your training?

_____

36. If you had to request and adjust naval gun fire, were there any differences in adjusting naval gun fire versus artillery fire? YES ___ NO ___. Explain:

37. Did you receive training on adjustment of TAC aircraft bomb strikes? YES ___ NO ___. If YES, where did you receive your training?

_____

38. Is adjustment of bomb strikes different than that of artillery or naval gun fire? YES ___ NO ___. If YES, explain the differences and describe how you adjusted bomb strikes:

39. Did you have to brief FAC aircraft? YES ___ NO ___. If YES, what procedures did you use and what information did you have to furnish FAC? Explain:

DISMOUNTED RECONNAISSANCE

40. Did you as an aeroscout observer perform dismounted reconnaissance from a vantage point? YES ___ NO ___. If YES, explain why this procedure was used and how you performed it:

41. Did you as an aeroscout observer perform dismounted reconnaissance of a bridge, road, obstacle, barrier, defile, minefield, etc.? YES ___ NO ___. If YES, explain why this procedure was used and how you performed it:

42. Did you as an aeroscout observer dismount to search dead bodies for intelligence materials? YES ___ NO ___.

MAP READING AND AERIAL NAVIGATION

43. What specific skills in map reading are essential for an aeroscout observer to know?

44. What methods or techniques did you use for maintaining geographical orientation during flight?

45. Did you use aerial photographs to help supplement the topographical maps? YES ___ NO ___.

46. What map scale did you find best to use as an aeroscout observer?

47. How did you find it best to keep your map oriented during flight?

48. Did you always plot targets on your map? YES ___ NO ___. If YES, how did you do it?

49. Did you always plot potential LZ's on your map? YES ___ NO ___.

50. Did you always gather information to update the topographical maps as to changes in roads, buildings, etc.? YES ___ NO ___. If YES, how did you indicate the changes? Explain:

51. Did you always make a map study of your area of operation before a mission? YES ___ NO ___. If YES, what specific factors did you look for?

52. How accurate does the observer have to be in locating the aircraft's position during aerial observation? (Please specify in meters, plus or minus error, that is allowable:)

53. How accurate does the observer have to be in determining direction of flight during aerial navigation? (Please specify in degrees the amount of error that is allowable:)

54. What basic map reading skills and knowledges must the observer know or be able to perform? (Example: map symbols, contour lines, intersection, etc.) Please list:

55. In addition to those skills and knowledges required in basic map reading, what other map skills and knowledges are required?

56. What methods, procedures, and techniques are required in aerial navigation that the observer must know or be able to perform?

57. What methods or techniques does the observer use in maintaining flight orientation?

58. Did the pilot make the map study with you? YES ___ NO ___.

59. Did you receive a mission briefing before a mission? YES ___ NO ___.
If YES, who briefed you?_____

AIRCRAFT MAINTENANCE

60. What specific duties and tasks did you perform as an aeroscout observer concerning maintenance of the aircraft?

61. What maintenance forms did you maintain or help in maintaining?

62. Did you help in maintaining the aircraft weapons sub-system? YES ___ NO ___. If YES, explain what tasks you were required to perform:

63. What aircraft safety and handling procedures must the aeroscout observer know when working around the aircraft?

INDIVIDUAL WEAPONS

64. In what situation(s) did you have to fire your individual weapons from the aircraft?

65. What particular method or technique did you find best to use when firing your individual weapons from the aircraft?

66. What types of targets did you engage most frequently?

67. At what slant range did you normally fire from when engaging targets with your individual weapons?_____

68. At what aircraft speeds did you most frequently engage targets with your individual weapons?

COMMUNICATIONS

69. Did you perform monitoring duties for the pilot at all times? YES ___ NO ___.

70. What types of radio communications does the observer use most frequently? (Example: spot report, bridge report, etc.)

71. Did you have to use crypto devices? YES ___ NO ___.

AIR CAVALRY OPERATIONS

72. What specific types of Air Cavalry operations are essential for the aeroscout observer to understand in order to perform his job?

73. What procedures should the aeroscout observer know when working in conjunction with ground infantry elements?

74. When performing night reconnaissance operations, what visual scanning methods or techniques did you find best to use?

75. What types of ground operations with the Armored Cavalry units does the aeroscout observer need to understand in order to perform his job?

76. What are the duties of the aeroscout observer in a tactical assembly area?

77. When scanning at night, what particular features about the targets caused you to detect them?

78. Did you use image intensification devices at night for observation purposes? *YES* ___ *NO* ___. If YES, what particular methods of scanning did you find best to use?

GENERAL

79. Did you use nagivational charts? YES ___ NO ___.

80. Did you use weather maps, reports, and forecasts as an aeroscout observer? YES ___ NO ___.

81. Did you use aerial cameras? YES ___ NO ___.

82. Did you use a polaroid type camera to take reconnaissance photographs? YES ___ NO ___.

83. Did you use aeronautical charts? YES ___ NO ___.

84. Did you use radio navigational charts? YES ___ NO ___.

85. During the planning of a mission did you advise/help the pilot as to selection of:

    a. YES ___ NO ___ Course of flight
    b. YES ___ NO ___ Selection of checkpoints
    c. YES ___ NO ___ Flight route preparation

86. While airborne did you advise/help the pilot as to selection of:

    a. YES ___ NO ___ Course of flight
    b. YES ___ NO ___ Selection of checkpoints
    c. YES ___ NO ___ Flight route preparation

87. What preflight mission planning procedures did you as an aeroscout observer have to perform before going out on a mission?

88. Does an aeroscout observer need to know how to file a local flight plan? YES ___ NO ___.

89. Did you use or receive training on the following items of radiological survey equipment:

    a. YES ___ NO ___ IM-108/PD
    b. YES ___ NO ___ IM-93/UD
    c. YES ___ NO ___ DVC 3-2
    d. YES ___ NO ___ IM-174/PD
    e. YES ___ NO ___ AN/PDR-27

90. Did you receive training on how to conduct an aerial radiological survey? YES ___ NO ___. If YES, where did you receive your training?

_____

91. What are the essential elements that an aeroscout observer must know when receiving intelligence briefings and debriefings?

a. Briefings

b. Debriefings